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Opting Out of Medicare: private medical markets in Ontario

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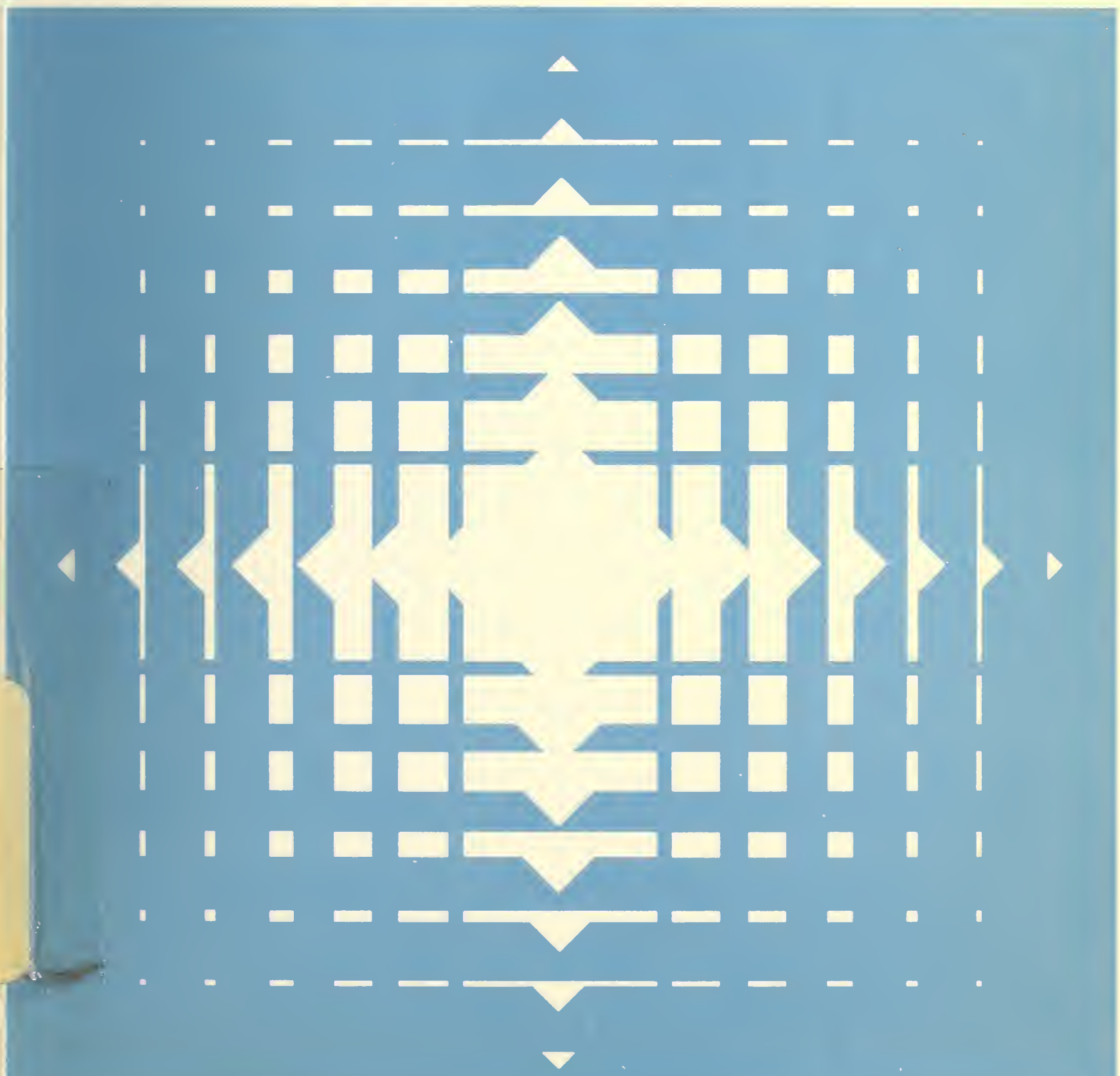

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Contents

Preface

Canadian medicare is in trouble. The spirit of the program has always been to ensure universal access to a comprehensive range of medical services on uniform terms and conditions. This intent is reflected in the provisions of the federal Medical Care Insurance Act, 1968. The late 1970s, however, have seen the development in a number of provinces, including Ontario, of a serious threat to universal medicare: the growth of private markets for services insured by the public program. In Ontario this private market involves the practices of physicians who exercise an option allowed them by the Ontario Health Insurance Plan (OHIP). Rather than accepting payment from OHIP at OHIP rates for all of their practice, they may choose to 'opt out' of the plan and bill all their patients at rates that may be considerably above the OHIP benefit. Patients are reimbursed at the OHIP rate, and physicians are responsible for collecting all accounts. Such opting out by physicians erects again the financial barriers to access, either uniform or variable, which the medicare program was intended to remove. The opting-out rate in Ontario in mid-1979 was just under 20 per cent, and was much higher in certain specialties and localities.

The opting-out issue in Ontario is important in itself, but it also provides a window on the political economy of medical care in the province. It raises a set of fundamental questions about the political and economic relationships between individual physicians, their patients, their medical colleagues, their organizations, and government. An analysis of opting out will improve our understanding of this system as a whole.

We have approached the issue from a political-economic perspective and with a focus on the practice behaviour of individual physicians. Our view of the medical care system emphasizes the fundamental decision-making role of physicians in the context of their individual practices and the important

role of political and economic variables in those decisions. Certainly, physicians' decisions about the services they provide are profoundly influenced by factors which may be considered 'medical': the condition of the presenting patient and the current state of the art and science of medicine. But medical motivations are not the only ones. Physicians have a considerable degree of discretion in making decisions about the level and mix of services provided to their patients, as well as about the structure of their practices (that is, labour and other resources used), hours of work, prices charged (in the case of opted-out physicians), scheduling of appointments, and so on. These practice decisions are influenced by the interplay of social, economic, and political factors, as well as purely 'medical' considerations. In other words we cannot understand physicians' practice behaviour unless we relate it to the political and economic context in which it occurs.

A central structure of the analysis is our model of physician practice behaviour (given in chapters 4 and 5). It includes a wide range of variables, and the data are compiled from many sources. Many of the relevant data (such as patient loads and services rendered) were included in the physician practice profiles maintained in the OHIP system. Other data (such as hours of work, expenses of practices, and various attitudinal measures) could be obtained only by interviewing physicians themselves. With the aid of a generous grant from the Physicians' Services Incorporated Foundation we were able to conduct a survey linking interview with practice profile data and establishing a data base unique in its comprehensiveness. Our data, gathered in the fall of 1976, represent the most recent available evidence on which to base a thorough analysis of the practice behaviour of opted-out physicians (and for that matter of opted-in physicians) in Ontario.

For purposes of public policy development our study produced some interesting findings. As we explain in chapter 3, we found several marked differences in the makeup of the opted-in and opted-out medical populations: the proportions of specialists, urban practitioners, and ideological 'conservatives,' for example, differed significantly in the two populations. Most notably, the proportion of academic physicians was considerably higher in the opted-out population. Given the symbolic as well as the quantitative significance of academic physicians in the medical care system, we suggest (in chapter 6) that there is a need for a specific policy response to this group.

The most important finding of the study, however, challenges conventional wisdom. The analysis in chapter 5 reveals that once other differences between opted-in and opted-out physicians were taken into account there is no indication that opting out *in itself* made a difference to their practice behaviour. Except in limited circumstances, the patient loads, hours of

work, waiting times for appointments, or other important dimensions of a given physician's practice did not appear to differ according to whether he was opted in or opted out.

Our results can perhaps best be presented through a hypothetical example. Consider two physicians, A and B, classmates at medical school, who have practised in the same specialty and the same locality for the same number of years. To complete the parallel, both have part-time appointments to a medical faculty. Dr A has opted out; Dr B has opted in. What difference can we expect in their practice behaviour?

If these two physicians are general practitioners, we can expect that Dr A will have a smaller patient load and that his practice style will reflect that fact (he may spend more time with his patients and make less income). If they are specialists, there is likely to be very little difference in their incomes or in their servicing of patients, although opted-out Dr A may have more expensive office facilities. Whether the two are general practitioners or specialists, however, Dr A's patients will face charges for medical care that Dr B's patients do not.

Ironically, this example is in reality rather improbable. Our study suggests that A and B, so similar in other respects, are unlikely to have made different option decisions. The decision to opt in or out is not taken in isolation from colleagues; it depends in large part on what other doctors in the same specialty and locality have decided to do. Drs A and B are therefore likely to be together, either in or out of OHIP.

In localities and specialties where almost all physicians have opted-out, knowing what differences may exist, if any, between opted-in and opted-out physicians is of little practical use to the patient. Even when a choice is available, patients who prefer physicians with established practices, or teaching positions, or appointments at particular hospitals, may find the field restricted to opted-out physicians.

The real question raised by the opting-out issue has to do not, as some have argued, with the encouragement or discouragement of particular styles of practice. The real question is fundamentally a financial one: Is a significant proportion of the costs of medical care to be borne in the private sector? The answer to this question entails an important social judgment. For our part, we hold to the belief that bearing and controlling the costs of medical care are responsibilities of the public sector; and the proposals we make in our concluding chapter are directed to those ends.

Acknowledgments

We are indebted to several institutions and numerous individuals for their assistance in the conduct of our research. The survey of physicians which provided the data on which our analysis draws so heavily was funded by the Physicians' Services Incorporated Foundation. Our work would have been impossible without the co-operation of the many physicians who participated in the survey; their generosity with their time made the survey possible; their openness and candour made the results useful. The Professional Services Monitoring Branch of the Ontario Ministry of Health was also most helpful in facilitating our work by providing practice profiles to physicians and aggregate data to us as well. During the course of the study Alan Wolfson was supported by a National Health Scholar Award from National Health and Welfare. Finally we are, of course, grateful to the Ontario Economic Council for its sponsorship of this project, and its patience in awaiting its completion.

For their help in analysing our data, interpreting the results, and preparing the manuscript several people deserve our thanks. Most especially, we wish to acknowledge the unstinting efforts and the remarkable talents of our research assistant, Stu Iglesias. Les Cseh of the Institute for Policy Analysis at the University of Toronto was of great assistance in our dialogue with the computer. The econometric work in estimating the model of physician behaviour could not have been done without the assistance of Dale Poirier. Morris Barer, and other individuals who remain anonymous to us, provided insightful and helpful criticism during the Ontario Economic Council's review process. Finally, for their unfailing good humour in preparing the manuscript through innumerable revisions our thanks are due to Tiggy Burford and Victoria Krangle.

OPTING OUT OF MEDICARE:
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1
Introduction

An analysis of 'opting out' among Ontario physicians can tell us a good deal about the political economy of health care in the province. In coming to understand why the opting-out provision exists, why it is exercised, and how its exercise affects the practice behaviour of physicians, we can learn much about the relationships between organized medicine, government, individual physicians, and consumers of health care.

With a few notable exceptions to be discussed in detail below, the fee-for-service physician in Ontario must choose one of two methods of billing for his entire practice. He may bill the Ontario Health Insurance Plan (OHIP) for all insured services provided to patients and will then be reimbursed at the OHIP schedule of benefits. Alternatively, he may 'opt out' and bill all his patients direct at a rate negotiated with them prior to service. In the latter case, patients are reimbursed by OHIP for that portion of the total bill that is equivalent to the OHIP benefit, and the physician is responsible for collecting his own accounts. In addition, some proportion of a physician's practice, whether he is opted in or opted out, may be in the form of uninsured services – such as cosmetic surgery, examinations at the request of insurance companies and other third parties, obesity injections, etc. – for which, of course, he bills his patients direct. Except for such uninsured services, direct billing represents the only instance of out-of-pocket costs borne by patients for medical services: it is one of the last vestiges of a price system for medical care.

Direct billing represents more than a vestigial price system, however; it represents the response of a sizeable minority of physicians to a fundamental change in the political and economic context in which health care is provided: the introduction of universal government-sponsored health insurance and the development of monitoring mechanisms for cost control. Opting out may increase the economic freedom of the individual physician by giving him a price instrument which is not available to opted-in physicians, but it

may symbolize a degree of political freedom as well. The decision to opt out, that is, may be made for financial reasons; but it may also be motivated by a desire to register a protest against universal government-sponsored health insurance and to preserve a sense of 'independence' from a government plant. Any explanation of the physician's decision to opt out of OHIP, then, must take into account not only his economic position but also his awareness of the political significance of his actions and his sensitivity to various forms of collegial and administrative control.

A BRIEF HISTORICAL REVIEW

The existence of optional methods of billing under health insurance plans pre-dates the entry of government into the health insurance field. Physicians' Services Incorporated, a physician-sponsored health insurance plan, in existence from 1947 to 1969, established precedents both for optional billing methods and for prorated payment. Physicians who chose to 'participate' in PSI submitted all bills for services to patients with PSI coverage direct to PSI and were paid by PSI at 90 per cent of the Ontario Medical Association fee schedule.[1] For non-participating physicians, PSI, like any other private insurance company, reimbursed patients direct at 100 per cent of the OMA schedule, and the physician was responsible for collecting his own accounts. The first government-sponsored health insurance scheme, the Ontario Medical Services Insurance Plan (OMSIP), which operated as an alternative to private insurance plans from 1966 to 1969, offered the physician a choice of billing procedure in individual cases. For each patient the physician could decide upon one of the following billing procedures. He could submit his bill to OMSIP and be remunerated at 90 per cent of the OMA fee schedule. He could bill OMSIP, and receive a 90 per cent prorated payment, and bill his patient for an additional amount. He could bill his patient for the full amount of the fee, in which case the patient would be reimbursed at 90 per cent of the OMA fee schedule.

When the government became the sole sponsor of health insurance plans in 1969 under the Ontario Health Services Insurance Plan (OHSIP), it continued to allow the physician this range of choice. Under this plan some 90 per cent of fee-for-service practitioners billed the government plan for at

1 This 90 per cent proration was the rule until 1966, when it was raised to 95 per cent for an eleven-month period and then to 100 per cent. About 85 to 90 per cent of Ontario physicians participated in PSI, and one-quarter to one-third of Ontario's population carried PSI coverage (the participation and coverage rates varied somewhat over time). Participating physicians agreed to accept PSI payment as full and final for patients who did not exceed an 'income limit' of $7000 for individuals and $10 000 for families.

least some of their patients. The extent of direct billing for some or all of the fee under OHSIP is not known. The only indication is an OMA poll taken in November 1969, which suggested that 75 per cent of fee-for-service practitioners charged their patients above the OHSIP benefit.[2] However, OHSIP administrators contended in 1970 that the majority accepted OHSIP payment as payment in full.[3] Whether these differences represented a trend or simply differences in perspective cannot be judged.

In November 1971 the so-called practice-streaming provision came into effect, making it mandatory for a physician to choose one of two methods of billing (either direct billing of the patient for the full fee or remuneration by the government plan at 90 per cent of the fee schedule) for his entire practice.[4] It was only in April 1972, however, that this provision became enforceable. At that time, under the new Ontario Health Insurance Plan (OHIP) merging medical and hospital insurance, private insurance companies ceased to be carriers of the government plan, and all billing records were consolidated in the OHIP computer.

A regulation made in June 1972 under the Health Insurance Act set out, among other things, certain exceptions to the 'practice-streaming' requirement.[5] Essentially, opted-out physicians were permitted to bill OHIP for ser-

2 See Marilyn Dunlop, 'Doctors' poll finds 75% charge over OHSIP rates.' *Toronto Star*, 29 November 1969.

3 See Eric Malling and Sidney Katz, 'Most Ontario doctors accept Medicare rates.' Montreal Gazette, 15 October 1970.

4 The practice-streaming requirement was first established in interim legislation and continued by the Health Insurance Act, Statutes of Ontario, 1972, Chapter 91, which came into effect in April 1972 superseding the interim legislation.

5 Ontario Regulation 323/72, s.59(4) and (6) under the Health Insurance Act provided as follows:

> (4) The following classes of accounts may be submitted directly to the Plan by a physician who does not submit his accounts directly to the Plan under section 21 of the Act: 1. Accounts for the performance of insured health services rendered to an insured recipient of a war veteran's allowance under the War Veterans Allowance Act (Canada). 2. Accounts for the performance of insured health services, rendered to an insured person where the physician had no prior professional relationship with the insured person and the services were urgently needed. 3. Accounts for the performance of insured health services rendered to an insured Indian who is a member of a band as defined in the Indian Act (Canada).
>
> (6) A physician who by reason of his membership in an associate medical group that is registered with the Plan renders insured health services in an outpatient, emergency, or any other clinical department of a public hospital, and the accounts for such services are submitted by the association directly to the Plan, shall not by reason only of that fact be deemed to be submitting his accounts directly to the Plan.

vices provided to war veterans or Indians or on a 'good Samaritan' basis. Furthermore, physicians with opted-out practices who were also members of a medical group, registered with OHIP, and associated with an outpatient, emergency, or other clinical department of a public hospital were allowed to submit bills to OHIP through their group. By October 1972, 13.5 per cent of Ontario fee-for-service practitioners had opted out of the government plan, a proportion that declined slightly until July 1978, when for reasons to be discussed below it began to escalate.

The major changes in the legal provisions regarding opting out since 1972 have had to do with the exceptions to the practice-streaming requirements and with the divorce of the OHIP schedule of benefits from the OMA fee schedule. In 1973 the exception for 'good Samaritans' was revoked.[6] In 1974 the exception allowing opted-out physicians to bill OHIP through registered hospital-based groups was restricted to members of groups associated with an outpatient or other clinical department of a *teaching* hospital or with an emergency department of any public hospital.[7] In 1976 a further category of exceptions was added: opted-out physicians were permitted to bill the plan for services provided in nursing homes, homes for the aged, sanatoria, children's mental health centres, and psychiatric hospitals.[8] In December 1978 permission to bill OHIP was again granted to members of groups associated with any clinical department of a public (not just a teaching) hospital.[9] Mean-

6 Ontario Regulation 357/73, s.3
7 Ontario Regulation 220/74, s. 12
8 Ontario Regulation 69/76, s. 1
9 Ontario Regulation 982/78. s.1. The amended version of Ontario Regulation 323/73, s.59 (4) and (4a), as of April 1979 reads as follows:

> (4) Subject to subsection 4a, the following classes of accounts are exempt from the application of section 20 [the practice-streaming requirement of the Act]: 1. Accounts for the performance of insured health services rendered to an insured recipient of a war veteran's allowance under the *War Veterans Allowance Act* (Canada). 2. Accounts for the performance of insured health services rendered to an insured Indian who is a member of a band as defined in the *Indian Act* (Canada) 3. Accounts for the performance of insured services rendered to an insured person in an outpatient or any other clinical department of a public hospital. 4. Accounts for the performance of insured services rendered to an insured person in a nursing home or in a home for the aged established and maintained under *The Homes For the Aged and Rest Homes Act*, or in a sanatorium licensed under *The Private Sanitaria Act*, or in a children's mental health centre under *The Children's Mental Health Centres Act*, or in a hospital under *The Children's Mental Hospital Act*, or in a hospital established or approved under *The Community Psychiatric Hospitals Act*, or in a psychiatric facility under *The Mental Health Act*, or in an institution designated an approved home under *The Mental Hospitals Act*, or in a designated facility to which *The Developmental Services Act, 1974*, applies.

while, in May 1978 increases in the OMA fee schedule and the OHIP schedule of benefits ceased to be proportional. The 1978 and subsequent schedules of OHIP benefits have been negotiated between the OMA and the provincial government; the OMA schedules of fees have been set unilaterally about 30 per cent above the OHIP schedule.

This bare recital of events cannot convey the political and economic significance of opting out. Let us therefore turn to a discussion of the forces behind these historical developments.

THE SIGNIFICANCE OF OPTING OUT: THE ONTARIO MEDICAL ASSOCIATION

The existence of the opting-out provision has always had a major symbolic and strategic importance for organized medicine in this province. It symbolizes the independence of physicians, both individually and as a self-governing profession, from government; and it enhances the bargaining power of organized medicine in negotiating the schedule of payments to physicians under the government plans.

From the very beginning of government-sponsored health insurance under OMSIP in 1966, the OMA has consistently urged its members to 'deal directly' with their patients. In the official pronouncements of the OMA the case for dealing direct has always been made in terms of the current policy regarding the negotiability of medical fees. In 1965 the OMA position was that its fee schedule was to be considered as a guide to physicians who were free to negotiate fees with their individual patients. In that year, in anticipation of the introduction of OMSIP, the OMA Board of Directors stated that 'The policy of our association is that a doctor must have the right to opt-out of any insurance plan, and thus be able to negotiate an individual fee with an individual patient' (Ontario Medical Association, 1965, 217).

In 1966 the OMA fee schedule assumed somewhat more importance. The OMA amended and approved a resolution from the joint advisory committee of the College of Physicians and Surgeons of Ontario and the OMA that, except under special circumstances, a physician might properly charge in

> (4a) Payment for the classes of accounts exempted by paragraphs 3 and 4 of subsection 4 may only be made where:
> (a) the physician performing the services is a member of an associate medical group that is registered with the Plan;
> (b) the accounts for such services are submitted by the association referred to in clause (a) directly to the Plan; and
> (c) the association referred to in clause (a) and physician accept the payment as constituting payment in full for the services.

excess of the OMA schedule only if his patient had a choice of another physician charging the OMA schedule and had been informed in advance that he would be charged in excess of the schedule. In 1969 in anticipation of the introduction of OHSIP this policy was reaffirmed, and the following resolution was passed by the OMA in addition:

> 1 (a) That the right of the patient to full benefits under his insurance contract when he consults a non-participating physician be affirmed.
>
> (b) That the right of the physician not to participate in (accept payment from) any medical insurance plan be reaffirmed.
>
> 2 That our fee schedule, developed by a responsible and autonomous profession, is not open to negotiation or proration with any body or group, except where council of OMA wishes to make special arrangements. The benefits of any medical insurance contract are a matter for decision by the insuring agency (Ontario Medical Association, 1969, 318).

The OMA strenuously opposed the introduction of the 'practice-streaming' requirement in 1971. Indeed this change in policy occasioned a more heated dispute between the OMA and the government than did that surrounding Ontario's entry into medicare in 1969. At its annual meeting in 1971 the OMA urged the Minister of Health to reconsider this decision, charging that the change would 'interfere with an OMA principle that permits an individual physician the right to determine which of several methods of patient billing he considers acceptable to his particular method of practice.' It further resolved:

> 2 (i) That the OMA continue to maintain the right of the physician to opt out of the government medicare plan and to deal directly with his patient and the right of the patient to receive the benefits of the plan.
>
> (ii) That the OMA accept the government's right to set the level of its insurance benefits and to require that any direct payment from the Plan to a doctor be accepted by him as payment in full.
>
> (iii) That the OMA work to ensure that the insurance benefits bear the closest possible relationship to the OMA Fee Schedule.
>
> (iv) That the OMA urge the government to seek a mechanism whereby the patient who is receiving premium assistance can be identified to ensure that insurance benefits will constitute payment in full.
>
> (v) That the OMA recommend to its members the wisdom of maintaining their option by as many doctors as practical dealing directly with the patient, thus assuring that the Association can continue effectively to set its own fee schedule. (Ontario Medical Association, 1971a, 346)

What the OMA apparently sought for its members was the ability to bill OHIP for services provided to low-income patients, while negotiating fees above the OHIP benefit with higher-income patients. It sought, that is, the economic freedom to vary fees across patients as well as the economic security of avoiding bad debts. Furthermore, it apparently feared (correctly) that economic security would prove more attractive to most physicians than the freedom to price-discriminate. The individual decisions of large numbers of physicians to opt into the plan would reduce the relevance of the OMA fee schedule as a guide to independent practitioners and increase its relevance as the basis of a schedule of benefits under OHIP. The OMA's refusal to negotiate the schedule would become more and more difficult politically to maintain.

These fears, of course, were fully realized. With only 10 to 12 per cent of the physician population of the province opted out, the major economic significance of the OMA schedule of fees was as the basis for OHIP payments, and a government facing escalating costs in the health care field could not be seen to allow the medical profession unilaterally to set the schedule of OHIP payments. In 1973 the OMA schedule of fees became a matter for negotiation between the government and the profession through the mechanism of a joint advisory committee on physician compensation.

Within this changed context the existence of the option has been crucial to the OMA's bargaining strategy. In February 1975 the OMA sought to reopen negotiations regarding the previously negotiated increase in the OMA fee schedule that was to go into effect in May 1975. In the face of the government's refusal to reopen negotiations the OMA announced that it would henceforth consider the government professional bargaining process to apply only to the 'schedule of benefits' under OHIP and not to the OMA fee schedule itself. The latter would be set unilaterally by the OMA as the basis for billing by opted-out physicians. The effect of this strategy was initially blunted by two federal initiatives: the anti-inflation program and the amendments to the anti-combines legislation banning undue restraint of competition in the area of professional services. The anti-combines legislation cast doubt upon the legality of an OMA fee schedule (other than as a schedule of payments to physicians under OHIP), and the anti-inflation legislation limited the rates of increase to the schedule which could be negotiated.

In 1978 the latter constraint was removed, and bargaining between the OMA and the government over physicians' compensation intensified. As their individual taxation years ended physicians began to move out from under federal anti-inflation controls on their fees (the controls governed fees, not incomes, so that increases in income attributable to increases in workload, that is, in the number of services provided, were considered legiti-

mate). The OMA had, as noted, previously announced its intention, upon the end of the federal anti-inflation program, to promulgate a fee schedule unilaterally and to negotiate with the government only the OHIP schedule of payments. Accordingly, the OMA increased its 1978 fee schedule, effective 1 May 1978, by 36 per cent and maintained in its negotiations with the government over the OHIP schedule that if a large increase in the OHIP schedule was not forthcoming large numbers of physicians would opt out to charge OMA rates. Despite this argument, the government held to a 6.25 per cent increase in the 1978 schedule. Effective 1 January 1979 the OMA schedule was raised another 6.9 per cent and the OHIP schedule by another 6.6 per cent.

With the removal of one set of federal controls (the anti-inflation legislation), then, the gap between the OMA fee schedule and the OHIP schedule of benefits widened dramatically. Furthermore, the threat of a challenge to the OMA fee schedule under the federal anti-combines legislation appears to have receded somewhat, although as noted below it remains a possibility.

Throughout the OMA's negotiations with government, opting-out has constituted not only a strategic consideration but an issue in itself. The OMA has consistently pressed for a removal of the 'practice-streaming' provision – either outright or, less preferably, through an expansion in the number of exceptions to the practice-streaming rule. Its consistently preferred option has been a return to the pre-1972 practice of allowing all physicians a choice of billing options for each patient: submitting the accounts to OHIP, billing the patient direct, or combining these two options by 'balance billing' (that is, by billing OHIP at the OHIP rate and billing the patient for an additional amount). The OMA's continued pressure against the practice-streaming rule is reflected in a May 1976 statement by the outgoing president of the OMA:

> The association is pressuring with utmost vigour to persuade the Ministry of Health to amend the regulations under the Health Insurance Act and eliminate practice-streaming. This would eliminate the hard-and-fast rule against billing some patients direct at 100 per cent or more of the fee schedule and others to the insurance plan with 90 per cent payment being accepted as full payment.[10]

He further stated that the choice of billing procedures would take into account the patient's ability to pay. What was actually negotiated in 1976, it will be remembered, was the addition of services provided in nursing homes,

10 Dr Ian MacNeill was thus quoted in Marilyn Dunlop, 'Doctors want more from some patients.' *Toronto Star*, 19 May 1976

sanatoria, and so on to the categories of services for which opted-out physicians were permitted to bill OHIP. At various times the OMA has also urged that an opted-in physician be permitted to bill a patient direct when, in the physician's judgment, the patient's demand for service was not medically warranted.

Given this OMA position, it is surprising that the one major tightening of the practice-streaming requirements – the restriction of the hospital-based group exception to teaching-hospital groups in 1974 – did not occasion a political outcry on the part of the OMA. The original 1972 provision, in effect, allowed physicians to treat and bill OHIP for less affluent patients through a hospital-based group (thus reducing problems of bill collection), while billing more affluent patients at higher prices in an opted-out private practice. One might have expected the restriction of this privilege to physicians associated with teaching hospitals to encounter considerable resistance from the OMA. Instead, the regulation passed virtually without comment. It may be that very few, if any, opted-out physicians were in fact taking advantage of the pre-1974 rules allowing them to bill OHIP through public hospital-based groups registered with the plan. The constituency for a protest against the restriction of this provision, then, may have been very small or non-existent. Unfortunately OHIP does not maintain the sort of records that would allow us to support the surmise that this 1974 change did not have a significant quantitative impact.

THE SIGNIFICANCE OF OPTING-OUT: LOCAL MEDICAL COMMUNITIES

As we shall see in the second chapter, the opting-out rate between April 1972 and July 1978 was fairly stable, ranging (after an initial peak of 13.5 per cent) between 10 and 12 per cent. After July 1978, as the changes discussed above had their effect, it climbed steadily, until in April 1979 it stood at about 18 per cent. This proportion is considerably higher, however, in certain medical communities defined either by specialty or by geography or by both.

As of July 1978 (the last month for which such data were available), opting-out rates by specialty ranged from 2 per cent in physical medicine and 5 per cent in internal medicine and paediatrics, to 40 per cent in obstetrics and gynaecology. As of February 1979, opting-out rates by OHIP district ranged from 2 per cent in Thunder Bay to just under 25 per cent in Mississauga. In Peterborough County the rate stood at almost 50 per cent; and in some smaller municipalities all physicians had opted out.

The economic and political forces which have shaped this pattern of opting out have a long history within the medical profession in this province. In general, the local medical society, which in many areas coincides with the hospital medical staff association, is politically, socially, and economically cohesive. This may not be so much a matter of the exercise of political, social, and economic sanctions (although certainly these exist in the form of the granting of hospital privileges, the referral of patients, the scheduling of operating room time, and the tenor of social exchange) as it is a matter of the existence of a community of shared expertise and experience within which political and economic behaviour is shaped.

Politically, the results of these forces seem to be an ideological similarity within particular medical communities and a tendency to view the local medical society (often acting through the OMA or as the hospital medical staff association or both) as the most appropriate channel of political influence (Tuohy, 1974). Indeed, the politics of the OMA have always been based locally although the political strength of local medical societies vis-à-vis their own members and vis-à-vis the provincial association varies considerably (Grove, 1970, Tuohy, 1976a, 1976b).

Economically, this local cohesiveness facilitates the establishment and maintenance of common price structures. In most professional markets, including medicine, professionals have suspected the practitioner who charges lower prices than his peers of offering services of a quality lower than the community standard. 'Price-cutters' in medicine, then, may find themselves in conflict with local agencies of peer review such as hospital staff committees, which have the effective ability to award, refuse, or curtail hospital privileges. When most physicians in a community have opted into the government insurance plan the question of price-cutting does not arise. But when a significant number of physicians have judged OHIP remuneration to be inadequate and have opted out to charge higher prices, price-cutters (including opted-in physicians) may find themselves subject to sanction.[11]

The relationship of the provincial association to these locally powerful medical groups is ambivalent. On the one hand, as noted, local medical societies form the political base of the OMA. On the other hand the guiding principle of OMA policy is an individualistic one – a defence of the individual physician's freedom to organize his own practice, including his freedom to

11 Evidence on this point is only impressionistic but of considerable political significance. See, for example, the charges of then provincial Liberal Leader Robert Nixon, reported in 'Community hospitals operating as closed shops, Nixon claims.' *Globe and Mail*, 9 February 1973. For a theoretical treatment of this point see Reuben Kessel's classic article (Kessel, 1958).

set his own fees. The tension between the individualistic ideology of the OMA and the power of local medical groups has become visible on only a few issues, but these issues have been significant. It was apparent in the long process of establishing the OMA fee schedule as the usual basis of charges to patients, which in effect legitimized the charging of fees *below* the prevailing rates in some medical communities.[12]

It has also been apparent in the OMA's policy toward hospital privileges. Until a few years ago the OMA consistently advocated an 'open hospital' policy, which would require a public hospital to admit to its staff any qualified physician in its surrounding community who applied for privileges (OMA, 1962, Recommendation 4; 1971b). This policy would limit the discretion of hospital Medical Advisory Committees in making recommendations regarding the granting of hospital privileges and hence limit the ability of hospital medical staffs to use the control of hospital privileges as a mechanism for the maintenance of common price structures. A 1975 revision of the open hospital policy, however, modified the extent to which it would circumscribe the discretion of local hospital medical staffs. At its February 1975 meeting the OMA passed a resolution qualifying its standing policy that 'all physicians should have an appointment on the medical staff of the hospital serving the community in which they practice,' by adding that it 'at the same time recognizes the responsibility of the MAC (Medical Advisory Committee) to advise the Board of Governors of its hospital to exercise its responsibility in granting, limiting, or refusing privileges – provided an appeal mechanism continues to exist on a local and a provincial level.' It also urged improvements in the appeal mechanism to protect 'the rights and freedom of the individual physician' (OMA, 1975, 145–6).

The OMA's policies do little to encourage or discourage the development of local concentrations of opted-out physicians. Its policies simply assert the individual physician's right to choose his method of billing, while encouraging him to direct-bill. Its official policy on billing practices, as noted above,

12 Evidence of local price structures above the OHIP benefit is again only anecdotal, but the anecdotes recur in interviews with various knowledgeable sources. The tension referred to was apparent, for example, at the 1966 annual meeting of OMA. A resolution from the Joint Advisory Committee of the College of Physicians and Surgeons and the OMA to the effect that a physician might not properly charge in excess of the OMA fee schedule unless his patient had a choice of a physician charging the schedule and a prior understanding that the fee would be in excess of the schedule was passed by the OMA including the proviso 'unless special circumstances warrant.' Another proposed amendment which would have required that the patient have *the opportunity for* a prior understanding was not passed.

advises its members not to charge in excess of the OMA fee schedule unless the patient has been informed in advance that he will be so charged and has a choice of another physician charging the schedule.[13] There is, however, no stated obligation upon the physician to take into account the availability of opted-in physicians in deciding whether or not to opt out or in establishing his fee structure.[14]

THE SIGNIFICANCE OF OPTING OUT: THE MEDICAL REVIEW COMMITTEE

Opting out is a response not only to the symbolic fact of a government health insurance plan and to a negotiated fixed fee structure but also to the institution of procedures for monitoring the billable service volumes of physicians' practices. The same legislation which established the practice-streaming rule also established a Medical Review Committee of the College of Physicians and Surgeons. The Review Committee functions as part of an audit procedure in which 'aberrant accounts' (accounts of physicians billing the government plan in excess of the acceptable range for their specialties) are first identified by the plan and referred to the Committee for investigation. As originally conceived the Review Committee was to have been located within the Ministry of Health. Under pressure from the OMA and the College the legislation was changed before passage to establish a strange hybrid mechanism: it provided for the appointment by the minister of a committee of not more than seven members (five of whom were to be physicians) from a list submitted by the College and established this Committee as a committee of the College. It makes recommendations in matters regarding OHIP payments to individual physicians, not, however, to the Council of the College but to the general manager of OHIP.

13 Similarly, a regulation passed by the College of Physicians and Surgeons under the Health Disciplines Act (S.O. 1974, ch.47) includes in its definition of professional misconduct the following clause: 'charging a fee which is in excess of the fee in the schedule of fees of the Ontario Medical Association without prior notification to the patient as to the excess amount of the fee' (O. Reg. 577/75, s. 26.7). An agreement reached in March 1979 between the OMA, the Ontario Hospital Association, and the government modifies the policy somewhat. It states that opted-out physicians will be required to give prior notification if their charges are to be above the OHIP benefit. However, the above regulation has not yet been amended to give effect to this agreement.

14 The joint agreement mentioned above (note 13) also declares that the three parties will begin talks with the purpose of ensuring 'that in every public hospital in Ontario the patient will have a choice of access to physicians' services at OHIP rates.' If such a guarantee can be enforced, it would at best inhibit price-discriminatory practices for services rendered in hospital.

In the first year of the Committee's operation (1972–3), the government plan simply referred to it the accounts of all physicians billing in excess of $10 000 a month for three consecutive months. In May 1973, dissatisfied with the crudeness of this measure, the Committee announced that physicians with high levels of servicing would henceforth be identified on the basis of formulas (the 'quality service payment formulas') relating dollar volumes to maximum weekly service which, in the judgment of professional committees, were compatible with the maintenance of acceptable levels of quality. The College has emphasized that the development of this procedure arose from its recognition that 'there is a limit to the number of services which an individual physician can perform at an acceptable standard of practice beyond which the quality of the services, both individually and collectively, will decline' (College of Physicians and Surgeons of Ontario, 1973, 1) and not from a desire to limit the incomes of physicians. In any event identification by the 'formula screen' of a physician's accounts does not in the College's view imply 'overservicing' on the part of the physician but simply calls for a judgment of his peers on less strictly quantitative grounds as to whether his servicing levels are appropriate. Both the College and OHIP are dissatisfied with the arbitrariness of the formula screen and are seeking to develop more refined instruments.

The reaction of the OMA to the activities of the Medical Review Committee has been one of growing dissatisfaction. Its initial response to the Committee's 'quality service payment formulas' in May 1973 was one of guarded approval. The establishment of maximum weekly service volumes was endorsed by the OMA only with the proviso that these limits be considered not arbitrary payment ceilings but rather a device to identify individual physicians, who would retain the right to attempt to justify their high volume of service to the Review Committee (OMA, 1973, 577–8). One year later it had become apparent that the Review Committee was not routinely allowing physicians a personal hearing before recommending that their payments be reduced; and the attitude of OMA delegates at their annual meeting was considerably more hostile. The *Canadian Medical Association Journal* offered the following rather convoluted comment as capturing the essence of this attitude:

> Use of college letterhead (by the Medical Review Committee) has either led people into believing that the MRC is a committee of the College – which it is not – or we are rapidly coming to the point where the Minister of Health and his department, committees appointed by the government – like the MRC – and the college are really regarded as arms of the same institution – the provincial government. Perhaps it's time we recognized that the college is 'they' and no longer 'us.' (Geekie, 1974, 1401)

The relevance of the MRC to opting out is twofold. The government's attempt to respect the appearance of professional autonomy by locating the MRC within the College has not, by and large, been successful; it seems in fact to be viewed as another symbol of governmental encroachment. Furthermore, mechanisms for more effectively identifying and limiting high service volumes may encourage more physicians to opt out. The constraint of a negotiated fixed fee structure may lead physicians to change the volume and mix of their services (Evans, 1974), but once volume and mix are effectively monitored they may seek to escape the fixed fee constraint by opting out.

THE SIGNIFICANCE OF OPTING OUT: THE PROVINCIAL GOVERNMENT

The above discussion suggests that, as the OMA and OHIP fee schedules diverge and monitoring is made more effective, opting out will assume an increased political and economic significance. Large-scale opting out by physicians, both as a threat and as a reality, is of course a risky strategy; it risks provoking the government into a legislative response such as refusing to reimburse patients who are billed direct by their physicians. An assessment of these risks requires us to think about the cost and benefits from the government's point of view of allowing physicians to opt out of OHIP.

In the first place, of course, opting out inflicts administrative costs upon the government by forcing OHIP to process cheques to each of the physician's patients rather than one monthly cheque to the physician himself. Politically, the existence of the option has both advantages and disadvantages for the governing party. To the extent that it allows increases in OHIP payments to be held down by transferring costs to private individuals, it enables the provincial budget to be held down, and to be seen to be held down, in a period of fiscal conservatism. On the other hand to the extent that it incurs the dissatisfaction of voters faced with out-of-pocket costs for medical care under a government health insurance program it is politically costly.

In the context of government-professional relationships, the existence of the option provision has political advantages. It was an important part of the accommodation reached between government and the medical profession at the time of the introduction of medicare. Even as subsequently reinterpreted to require practice-streaming, it remains a symbol of the 'independence' of individuals from 'big government,' and as such it appeals to an ideological outlook shared by most physicians and a large segment of the voting population. The option also provides a safety valve by allowing physicians a means short of withdrawing their services of protesting the government plan.

The political advantages (to government) of the option provision undoubtedly outweigh its disadvantages as long as the proportion of opted-out physicians remains relatively low, not only in the province as a whole but also in particular localities and specialties. Large numbers of opted-out physicians (assuming of course that they charged above the OHIP benefit) would undermine the very rationale for the existence of a government health insurance program and would convey the impression of a government unwilling to challenge the power of a professional group. Even when the proportion of opted-out physicians is low, there are similar political dangers for government to the extent that opting out is concentrated in particular specialties or localities, in other words, to the extent that it becomes difficult to find an opted-in surgeon or obstetrician or psychiatrist in a given area. Anecdotal evidence of such concentration has in the past received considerable attention in the press and in the Ontario Legislature,[15] and it has been argued that, if physicians are to be able to choose their method of billing, patients ought to have a similar ability to choose between opted-in and opted-out physicians.

The recent escalation of opting-out rates has exacerbated this problem. By spring 1979 the existence of local concentrations of opted-out physicians had become a volatile political issue at both provincial and federal levels. The current administration in Ontario is under attack both by the opposition parties in the Legislature and by federal authorities on the ground that opting-out concentrations threaten not only the spirit of a national health insurance scheme but also the letter of the federal Medical Care Insurance Act.[16] The latter requires, as a condition for federal cost-sharing of a province's health insurance plan, that at least 95 per cent of the province's population have access to comprehensive governmentally insured services on uniform terms and conditions. Large concentrations of opted-out physicians charging above the OHIP benefit presumably erect a financial barrier to medical care inconsistent with the federal requirement for universality (that is, accessibility to at least 95 per cent of the population). If physicians lower this barrier by price-discriminating (by charging lower-income patients only the OHIP rate, for example, while charging wealthier patients at a higher rate) they presumably contravene the 'uniform terms and conditions' requirement of the federal legislation. This sort of price discrimination is made even

15 See note 11. See also 'Kitchener's six psychiatrists opt out of OHIP.' *Globe and Mail*, 22 October 1973; 'Burlington doctors' fee to be studied.' *Toronto Star*, 19 June 1975

16 See, for example, 'Cassidy says dropouts from OHIP hurt universal access to health care.' *Globe and Mail*, 14 March 1979; and 'Monique Bégin wields a $600 million stick to keep provincial medicare plans in line.' *Globe and Mail*, 19 March 1979

more likely by the recent regulatory change restoring to opted-out physicians associated with public-hospital-based groups the right to bill OHIP for services rendered to patients in the hospital group context.[17]

Whether physicians charge uniformly above the OHIP benefit or price discriminate, then, opting out on a large scale provincially or locally would appear to threaten the federal conditions for cost-sharing, and a warning to this effect has already been issued by the federal government. Interestingly, however, the federal government has not yet chosen to use another instrument available to it – the anti-combines legislation – in counteracting the price effect of concentrated opting out. This may be evidence of either a lack of political will or simply a judgment that the provincial health insurance plan provides a more effective enforcement mechanism against local monopolies than does the anti-combines legislation.

Does opting out threaten the essence of Ontario's health insurance plan? In order to deal with this issue we need to know much more than we have known to date about why physicians opt out and about how opting out affects their pricing and servicing behaviour. It is to these issues that the present study is addressed.

17 The March 1979 agreement between the OMA, the OHA, and the government (see note 13), if effectively enforced, would at best ensure that hospital-based services are offered on uniform terms and conditions. It would not eliminate a new price-discriminatory version of 'practice-streaming' by opted-out physicians for their ambulatory patients: treating less affluent patients in the hospital group context at OHIP rates and more affluent patients at higher rates in private practices.

2
Background

The literature relevant to the question of opting out is very limited. Even including all the studies of the Canadian experience with varying prices in universal and comprehensive health insurance plans, only the Saskatchewan and the Ontario situations seem to have received systematic scrutiny. Beck's work on the Saskatchewan experiment with copayment is well known; in Ontario Wolfson has conducted two studies that bear tangentially on the issue of opting out. Some aggregate data on non-participating physicians exist and provide a longitudinal record since April 1972 broken down by specialty. This chapter reviews each of these sources in turn.

In a series of publications (Beck 1971, 1973, 1974, 1976, Beck and Horne 1976) Glen Beck has reported on the Saskatchewan copayment 'episode.' Ever the innovator in Canadian health insurance programs, Saskatchewan introduced copayment in its provincial insurance plan in 1968 (after a Liberal victory over the NDP at the polls); a charge of $1.50 per office visit and $2.00 for home and emergency visits was collected from patients by physicians and deducted from the insurance plan's reimbursement for these services. The copayment plan came to an abrupt halt with the return to power of the NDP in 1972. The removal of copayment charges was a major campaign issue, and the New Democrats' victory thus constituted an important political signal for the rest of Canada. No other province has attempted to introduce copayment charges for medical care; the political lesson at least seems to have been well learned.

Beck analysed utilization data in Saskatchewan prior to and during the copayment period in an attempt to measure the impact (if any) of the 'deterrent' charges. His results can be summarized as follows:

– Copayment reduced over-all utilization by about 7 per cent, and for some combinations of age of family head and family size, by as much as 24 per cent.

– For the poor (as defined by the Economic Council of Canada) utilization fell by 18 per cent; general practitioner services to this group declined by 14 per cent.
– For several groups (notably the richest) utilization during the copayment period was the same as or higher than that experienced with no direct costs.
– For the low-income sample, whose utilization fell, there was a shift in service mix from lower-paying regional examinations to higher-paying complete examinations.

The Saskatchewan experience was really Canada's 'cleanest' natural experiment with the effect of deterrent charges, but even the conclusions drawn from Beck's analyses are less than definitive. The utilization responses summarized above cannot simply be interpreted as demand effects, because of two complicating factors: the ability of physicians themselves to generate demand for their services (even in the presence of copayment charges) and changes in the level of the fee schedule.[1]

1 The endogenous demand theory of physician practice behaviour has now become part of the Canadian health economics literature. With roots in the notion of the physician's agency role articulated by Arrow (1963) and Feldstein (1974), models of the market for physicians' services which incorporate provider determination of demand as well as supply have been developed by Evans et al. (1973), Evans (1974a, 1974b), and Wolfson (1975, 1976). The basic premise of the theory is that the inability of patients to make informed consumption decisions with respect to medical care because of their lack of the requisite knowledge (and in some cases, emotional and/or physical impairment of their decision-making capability) leads them to delegate authority to physicians to make these decisions on their behalf. Thus an agency relationship is established between the physician and his patient in which the former acts as the effective 'demander' of medical care on behalf of the latter. Such agency relationships are not restricted to professional markets; what is relatively unusual (and troublesome from the standpoint of traditional economic theory) is that the demand agent in these markets is also a principal supplier of services. Unless the agency relationship is perfect (i.e. the agent ignores all interests except those of his client in making decisions) conflicts of interest will arise between the physician as demand agent and the physician as supplier. In particular, he may be induced to advise his patient to 'demand' more services from himself (as supplier) than the patient really needs. In general, the determination of demand and supply become interdependent. The 'giant scissors' approach of conventional microeconomic theory to the determination of prices and quantities by the interaction of independent demand and supply curves with the attendant attractive welfare implications based on consumer sovereignty goes by the board. A new theory must be developed based on the notion of endogenous demand in the provider's supply decision, and the determination of prices and quantities must be derived from a more complete specification of the supplier's utility function than one including only income and leisure. Such a model is articulated in chapter 4 and in fact provides the theoretical framework for our empirical investigation of physician practice behaviour.

In light of the discretionary power of physicians the utilization responses which were observed by Beck must be viewed as combinations of adjustments on both the demand and the supply sides of the market. This is particularly apparent from the increase in higher-priced services during the copayment period. Possibly, in response to a decrease in patient-initiated visits by the poor, physicians shifted the mix of services to those patients who did continue to come in towards higher-priced services. A persuasive demand-generation story can also be told about the increase in utilization by the rich, despite the introduction of a user charge. It is not hard to believe that physicians compensated for the exogenous reduction in demand from poor patients be endogenously creating more demand from less price-sensitive rich patients through increased recall rates and more expensive services per visit.

Another confounding factor in Saskatchewan was the sharp increase in the fee schedule (over 12 per cent in 1968) at the same time as the institution of user charges. A target-income model of physician practice behaviour or more generally a backward-bending supply curve would predict a negative servicing response to this fee increase. The aggregate reduction observed by Beck could therefore be as much a supply-side response to higher prices as a deterrent effect on the demand side. In summary, all that can be said about the copayment experiment in Saskatchewan is that the aggregate effect in terms of reduction in utilization via the deterrent effect is indeterminate, and the distributional impact across income classes is decidedly perverse.[2]

The Saskatchewan experience is relevant to our study of direct billing in so far as it represents a case study of the system's response to user charges. There is, however, one crucial difference between the copayment scheme in Saskatchewan and direct billing in Ontario; whereas the former was a system-wide application of direct charges to patients, the latter is confined to relatively small parts of the physician and patient populations.[3] In Ontario there is the added complication of a direct-charge submarket operating within a general market with zero price facing most users. In Saskatchewan the effect of user charges was observable only across time; in Ontario this effect is potentially observable both longitudinally and cross-sectionally. Moreover, since different opted-out physicians can charge different prices, one would expect the Ontario experience to yield more information on the effect of price on utilization (within this submarket) over an entire range of prices.

2 For a fuller discussion of Beck's results see Evans and Wolfson (1978).

3 There was another difference: since the Saskatchewan copayment was centrally determined, there was no potential for price-discriminating adjustments on a case-by-case basis as existed in the case of provider-determined differential charges under direct billing (Barer et al., 1979).

Unfortunately, the data necessary to do such a study are simply not available; one would need information both on the prices charged by various opted-out physicians and on the differential rates of utilization by patients facing those charges. Since prices can vary even within individual practices (price discrimination), the level of disaggregation required in such data is formidable. Some survey information is now available on average prices for the entire practice of opted-out physicians, and these data will be presented and analysed in the following chapters; there are still no data directly linking utilization by individual patients to the out-of-pocket charges they face.

There have been two studies conducted in Ontario, however, which explore the impact of the payment option made by individual physicians in terms of the supply of services on the one hand and utilization by patients on the other. Wolfson (1975) investigated various determinants of the supply of services delivered by Ontario general practitioners in May 1972. In an attempt to identify discretionary areas of practice, he first aggregated services in each of thirty-six categories into county totals expressed both in terms of services per capita and services per patient[4] in each county. These seventy-two dependent variables describing service levels were then regressed on two sets of variables, one describing the sociodemographic characteristics of the county populations and the other describing characteristics of the health care system in the county, including characteristics of the providing physicians. It was hypothesized that the intercounty variation in the levels of those types of services whose provision was strongly influenced by the exercise of physician discretion would be related predominantly to 'system' characteristics, while non-discretionary service levels would be more related to population characteristics. One of the 'system' variables included in these regression analyses was the proportion of a county's general practitioners who were opted out. It was, therefore, possible to determine the effect of this aggregate variable on the system-wide provision of services in each service category.

The results of this exercise were quite interesting. It was found that the total level of general practitioner services per capita was not significantly related to the proportion opted out, but that total services per patient was positively and significantly so related. One might guess, then, that in counties with a relatively high proportion of opted-out general practitioners, there were fewer patients per capita (deterrent effect?) but more services per patient. This conclusion is reinforced by the regression results on encounters

4 'Patient' denotes an individual who received one or more services from a general practitioner in the month of May 1972. 'Services' is defined in terms of billings rather than discrete units.

per patient, where one discovers a significant positive coefficient on the opted-out variable.

Turning to particular types of service we find that the proportion of opted-out general practitioners was a significant and positive determinant of both per capita and per patient levels of allergy shots, emergency night and holiday visits, home visits, injections, and major surgery done by general practitioners. It was also significantly positively related to office general assessments per patient (but not per capita) and to anaesthetic services per capita (but *not* per patient).[5] Interestingly, none of these service blocks was designated as non-discretionary in terms of the over-all regression results on the intercounty data. One would surmise that the presence of relatively large numbers of opted-out general practitioners in a county might reduce the number of patients per capita and put pressure on physicians to generate more services per patient in those categories over which they exercise most discretion.

Having identified discretionary and non-discretionary service types (about half in each group), Wolfson then tried to relate the variation in service levels in the discretionary categories across individual physicians to characteristics of the physicians themselves, their patients, their communities, and the local health care system in which they worked. Again, one of the variables introduced in these individual physician regression analyses was the option type of the practitioner.

The results of these analyses are again quite informative. There is no significant effect of the option type on total services performed, but patient loads of opted-out general practitioners are significantly smaller than those of their opted-in counterparts, and the encounters per patient for opted-out practitioners are significantly higher, as is the total cost per patient. Somewhat surprisingly, however, when one reviews the results of the regression on specific service types one finds that in only four cases does the option type of the physician make a significant difference in terms of services performed. The first is the case of anaesthetic services provided by general practitioners.[6] For opted-out practitioners, services in this category constitute a larger proportion of their total practice, although the *level* of these services is not significantly higher for opted-out general practitioners than for those who

5 The discretionary element in the provision of anaesthetic services by general practitioners probably relates to the willingness of general practitioners to provide anaesthetic services in hospital, as opposed to sole reliance on anaesthetists.

6 It is possible that in this case the causation is reversed, i.e. general practitioners who have a large proportion of their practice in anaesthesia are less vulnerable to the deterrent effect of price on their patients and therefore may feel less 'exposed' by opting out.

opted in. One finds a similar result for routine office visits. In the case of injections and annual health examinations, both the level and the proportion of total practice in this service category was significantly higher for opted-out practitioners.

Wolfson's results are suggestive concerning the impact of the option decision on the supply of services by general practitioners. In general it appears that being opted out has a negative impact on the numbers of patients but that sufficient compensation is made by opted-out physicians through increased encounters and services per patient that the over-all service levels are not significantly different from those attained by opted-in physicians.

In a separate study Wolfson and Solari (1976) investigated the option type from a different point of view. Using data derived from an Ontario family survey (Manga, 1978) and merged with diagnostic data from OHIP, they examined utilization by a sample of 3887 patients during the period of 1 May 1974 to 30 April 1975. The primary purpose of this study was to attempt to identify those characteristics of patients that were associated with high utilization, but in the course of the study two variables were introduced describing the providers from which these patients received services. An index of cost per patient for the physicians treating each patient was constructed, measuring the extent to which a patient was treated by physicians who, on average for their entire practices, had relatively high costs per patient.[7] Furthermore, and of particular importance to our present inquiry, a variable was created that measured for each patient the services received from opted-out physicians as a proportion of total services. The patient characteristics on which data were available were age, sex, marital status, education, family income, the distance from the nearest general hospital, a health status index computed from diagnostic information,[8] and utilization rates in terms of both dollars and encounters. Multiple regression analyses were conducted relating utilization to all the variables described above for each of five

7 Index of cost per patient of patient j's physicians =

$$\mathrm{ICP}_j = \sum_{i=1}^{n} w_{ij} \cdot \mathrm{Billings}_i / \mathrm{Patients}_i,$$

where patient j receives services from n physicians; w_{ij} is the proportion of services received by patient j from physician i; billings/patient for the ith physician is computed after removing j's services from the numerator and 1 from the denominator; i.e. it is billings/patient for the *rest* of i's practice.

8 The weights used in the computation of this index were derived from an earlier study on the construction of a health index (see Wolfson, 1972).

samples: a random sample of 525 individuals, those individuals who received over $150 worth of services during the period (N = 546), those who had more than sixteen physician encounters (N = 362), those who received more than 70 per cent of their care from opted-out physicians (N = 151), and those who received less than 10 per cent of their care from opted-out physicians (N = 420).

Some interesting results of this study are relevant to our discussion of the impact of direct billing of the patient. First, it becomes clear that the patients who receive most of their care from opted-out physicians constitute a very different group from those who receive very few opted-out services, or indeed from the average patient. The average patient (from the random sample) receives $94.50 worth of medical care in a year; when psychotherapeutic services are excluded the figure drops to $91.90.[9] The comparable figures for the high opted-out users are $59.20 and $58.90; for the low opted-out users the figures are $89.20 and $86.30, and the difference between these two samples is significant at the 95 per cent confidence level.[10] Thus, the high opted-out users have much lower dollar volume utilization rates in general, and only a trivial part of these are related to psychotherapy services (30¢ as opposed to almost $3 for the low opted-out user sample). As measured by the number of physician encounters the difference between the high and low opted-out users is equally stark; the average number of encounters for the year was 4.3 for the former and 7.9 for the latter, a very significant difference.

Interesting differences were also observed between the high and the low opted-out users in terms of the explanatory variables introduced into the regression equations to explain variation in utilization. The most important of these variables in terms of explanatory power was the index of health status that was computed for each patient using diagnostic information derived from the physicians' service claims. The high opted-out users were significantly healthier than those with low opted-out services, 0.0110 versus 0.0199 on the 'ill-health' index where higher scores represent worse health. There were no significant differences with respect to age or sex between the two samples. However, the high opted-out users had significantly higher family incomes ($18 834 versus $15 691) and higher education of family

9 It should be noted that all patients with more than 50 per cent of their total services in psychotherapy were removed from the study population, as well as those whose only significant diagnosis was for a psychiatric condition.

10 It should be noted that the utilization figures cited include payments by OHIP with respect to services provided by opted-out physicians but exclude direct charges by these physicians in excess of the OHIP benefit.

head (13.5 years versus 12.2 years). There was also a significant difference in terms of marital status: 92.1 per cent of the high opted-out users were married as against only 86.7 per cent for low opted-out users. There was no significant difference in the distance from the nearest general hospital.

The average index of cost per patient of the physicians seen by the high opted-out users was significantly higher than for the low opted-out user sample, 1.12 versus 0.98. This would seem to imply that opted-out physicians are in general more 'expensive' than opted-in physicians not only in terms of price charged but also in terms of OHIP payments per patient. This finding corroborates a similar result noted above in Wolfson (1975).

It appears, then, that patients who use predominantly opted-out physicians' services constitute a very different group from those who use very few of these services. As could be expected, they are richer. But less obviously (on an intuitive basis) they are healthier, more often married, and more highly educated. In general they have lower utilization rates as individuals, but the physicians they go to have higher average costs per patient across their entire practices. This is not as paradoxical a result as it might at first appear. One might expect, for example, that opted-out physicians' patients would see fewer different physicians than those of opted-in physicians. This difference might be related to increased 'shopping-around' in the absence of direct user charges, although an equally plausible story relates it to the poorer health of low opted-out users and the attendant requirements for referral. If opted-out physicians see patients who are more likely to 'concentrate' their utilization on one physician than are patients of opted-in physicians, one could then expect higher average costs per patient for opted-out physicians than for opted-in physicians, even though their patients, in aggregate across all their providers, have lower utilization rates.[11] Nevertheless, it appears that opted-out physicians, when they do see a patient, generate more utilization for that patient than do their opted-in counterparts.

In the results of the regression equations in this study there are some additional items of interest with respect to the impact of the option type. Separate regressions were run for each of five samples: a random sample, two high-utilizing samples in terms of payments and encounters, and two samples defined in terms of the proportion of services received from opted-out physicians (more than 70 per cent and less than 10 per cent). In each

11 This interpretation of a greater tendency towards multiple physicians among patients of opted-in physicians is also consistent with the observation in Wolfson (1975) that opted-in physicians saw more patients than opted-out physicians but had fewer encounters per patient.

case regression equations were estimated with the dependent utilization variable measured in two ways: payment and encounters. The explanatory variables introduced in all equations included patient characteristics (age, sex, income, etc.) and two characteristics of the providing physicians treating each patient: the average index of cost per patient and the proportion of total services received provided by opted-out physicians. The unit of observation for these regressions was the individual patient, so the physician characteristics represent weighted averages for the group of physicians (in most cases a single-person group!) treating any particular patient.

In general the regression results allow one gratifying conclusion: the overwhelmingly dominant determinant of utilization by patients was ill-health. Patient characteristics other than health status, e.g. age, sex, income, education, etc. were relatively or absolutely insignificant. To the extent that variables other than health status did exercise explanatory power these tended to be physician rather than patient characteristics. In particular, utilization by patients seemed to be significantly related to the average index of cost per patient (ICP) of the attending physician in several of the samples. In addition, the proportion of services received from opted-out physicians (POUT) was a significant explanatory variable in several equations. In the random sample POUT was negatively related to utilization in both dollar and encounter terms, but only for the latter was the negative coefficient significant at the 95 per cent level. It appears, then, that there might be a deterrent effect on utilization of services by patients who face user charges but that this effect is significant only in terms of encounters. Intuitively this seems plausible; one would expect patient resistance to be greater with respect to repeat visits than to increased number of services per visit or to a change to a more expensive mix of services provided.

This effect is illustrated more dramatically in the regression results for the sample of patients with unusually high utilization rates (over $150 or over sixteen encounters in the year). For these patients we again observe a significant negative coefficient on the POUT variable, in the equation for total encounters per patient, but in the payment equations the coefficient is significantly *positive*. Apparently, then, opted-out physicians more than compensated for lower encounter rates by increasing payments per encounter sufficiently to yield higher over-all payments per patient.

There were also separate regressions run for the two samples of high and low users of opted-out physicians' services, with some very surprising results. Within the high opted-out user sample the most powerful explanatory variable was POUT itself! (This is the only instance where the health status variable did not dominate the regression.) Moreover, the coefficient

on the POUT variable was significantly negative, possibly indicating a deterrent effect within the high opted-out user sample; in other words those patients who received closer to 70 per cent of their care from opted-out physicians had higher utilization than those who received almost all their care from such physicians.

For the sample of patients with low use of opted-out physicians (less than 10 per cent) we find an entirely anomalous result; there is a significant negative effect on utilization in terms of payments but a significant positive effect on encounters! Apparently those patients who have no contact with opted-out physicians have fewer total encounters than those who have some small proportion of their services provided by opted-out physicians. This is a very strange result and may in fact reflect a case of reverse causation: it is not implausible that patients with large numbers of encounters are more likely to run into an opted-out physician sooner or later than are infrequent users. Most of the patients in this sample have no services at all provided by opted-out physicians; POUT then becomes more of a dichotomous variable measuring whether or not any such services were obtained, and as such the reverse causation story is credible.[12]

The studies discussed above are cross-sectional in design; they analyse the behaviour of physicians and patients at single points in time: May 1972 in the case of the study of physicians' services and May 1974 to April 1975 in the case of the patient utilization study. There has been no systematic analysis of opted-out physicians in Ontario over time. Indeed the Ontario Health Insurance Plan (OHIP) aggregate data that would have served as the major resource for such a study are ill-suited to the task. For the period up to July 1977 there do exist data on OHIP payments to subscribers as opposed to payments to participating physicians and on the number of non-participating physicians by specialty, but the per-physician data for the opted-out population relate only to that portion of a physician's entire practice that is opted-

12 This last point raises a more general problem. The preliminary results available from this unpublished study are derived from ordinary least squares regressions. If, however, the proportion of services obtained from opted-out physicians (POUT), which is treated in these regressions as an independent variable, is in fact endogenous and determined simultaneously with the utilization variables, the coefficients derived from OLS regressions will in general be biased. Unbiased coefficients could be obtained with estimation procedures for a simultaneous equation system, such as two-stage least squares, with POUT explicitly treated as a dependent variable as well as an independent variable. The regression results described above should therefore be taken as suggestive rather than definitive. They do, however, tend to corroborate Wolfson's earlier findings with respect to the negative impact of direct charges on encounters, though not on payments, except in the extreme cases of patients who use almost all or almost no opted-out services.

out. Since July 1977 data are recorded separately for opted-in and opted-out physicians. As explained in Chapter 1, some physicians have both kinds of practice; these physicians will be double-counted in the early OHIP aggregate statistics, and this will exert a downward bias on the per-physician averages in each case. The most that can be extracted for the period before July 1977 is the proportion of physicians in each specialty that had at least one opted-out practice for each month since April 1972 and the proportion of total expenditures that were paid direct to subscribers rather than to participating physicians.

The information on non-participation rates by specialty is particularly interesting in so far as it relates to the general hypothesis of physician discretionary power. The stories told about the ability of physicians to generate demand for their own services are usually couched in terms of the 'average' physician (e.g. Evans, 1974; Wolfson, 1975; Evans and Wolfson, 1978). Clearly, however, some physicians have more discretionary power than others by virtue of the nature of their specialties. Thus psychiatrists, who sell time rather than services, cannot really increase their turnover in the same way as can general practitioners. Not that the latter always do increase the number of services per hour without limit; just that the *power* to do so is much greater in general practice than in psychiatry. Anaesthetists are in the double bind of selling time-units and relying on other physicians (namely surgeons) to generate demand for their services. A priori, one would have thought that the surgical specialties, and in particular obstetrics, had less discretion in terms of demand generation than the medical specialties.

It can be argued that where the power to generate income through increased utilization is restricted physicians will be more inclined to opt out and take advantage of the price instrument. Where demand generation is relatively uninhibited, the risks and inconvenience associated with direct billing are likely to serve as sufficient disincentives to most practitioners in terms of the decision to opt out. There are of course other factors that influence the option decision: market power, the decisions of fellow-practitioners, and a host of physician characteristics that will be analysed in detail below. Nevertheless, the specialty itself, and its intrinsic relation to discretionary power over utilization, is a variable of real interest.

Table 1 presents the non-participation rates for seventeen specialties at quarterly intervals since October 1972 derived from aggregate statistics compiled by the Ministry of Health. There are several points worth noting in connection with the 'discretion' hypothesis:

– Obstetrics and gynaecology had the highest opting-out rate throughout the period.

TABLE 1

Percentage of physicians opted out by specialty

	Oct. 1972	Jan. 1973	Apr. 1973	July 1973	Oct. 1973	Jan. 1974	Apr. 1974	July 1974	Oct. 1974	Jan. 1975	Apr. 1975	July 1975
General practice	7.5	7.5	6.4	6.2	6.1	6.1	6.0	6.2	6.0	5.8	5.8	5.9
General surgery	17.5	17.8	17.2	15.9	16.1	16.0	15.4	14.7	14.8	14.9	14.3	13.6
Internal medicine	9.1	9.3	8.3	8.3	8.2	8.1	7.4	7.4	7.6	7.0	6.8	6.1
Obstetrics/gynaecology	40.4	38.1	36.7	36.2	35.4	35.8	36.7	35.4	36.3	35.9	35.5	35.2
Paediatrics	9.1	9.1	8.2	8.0	8.2	9.0	10.6	9.3	8.5	7.2	6.8	7.0
Orthopaedic surgery	18.3	16.9	15.9	16.4	16.0	15.0	14.6	14.9	14.6	14.4	15.5	14.1
Otolaryngology	19.3	18.9	18.3	17.7	19.1	18.0	16.6	17.2	17.0	16.5	16.4	18.9
Urology	32.4	31.7	27.3	28.6	28.8	30.6	28.8	28.9	28.3	27.2	28.1	27.9
Anaesthesia	30.3	31.1	29.3	29.6	28.2	27.8	28.0	29.8	28.4	28.1	28.6	28.3
Neurology	7.0	6.8	6.6	6.6	6.2	7.8	7.4	5.7	8.0	7.8	6.3	6.7
Psychiatry	25.6	25.4	25.5	26.5	27.1	27.3	27.5	27.4	27.3	26.7	27.5	27.9
Ophthalmology	26.3	27.2	24.9	25.0	26.8	26.6	26.1	27.2	26.3	25.9	26.0	26.1
Dermatology	7.1	6.1	5.8	5.9	4.8	4.6	5.5	3.7	5.5	5.3	4.3	5.2
Neurosurgery	9.1	8.3	8.3	6.4	8.1	7.3	7.5	7.4	7.4	7.1	7.3	5.6
Plastic surgery	28.1	29.2	27.3	26.5	24.6	23.9	21.1	22.2	20.5	20.0	18.5	22.1
Thoracic surgery	17.4	19.2	16.7	14.3	13.6	17.6	15.0	9.1	9.5	8.7	8.7	8.7
Physical medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	13.5	13.5	12.4	12.1	12.0	12.0	11.8	11.7	11.5	11.3	11.3	11.2
Total number of opted-out physicians	1334	1343	1245	1234	1252	1253	1244	1259	1261	1238	1253	1264

	Oct. 1975	Jan. 1976	Apr. 1976	July 1976	Oct. 1976	Jan. 1977	Apr. 1977	July 1977	Oct. 1977	Jan. 1978	Apr. 1978	July 1978
General practice	5.9	6.2	6.2	5.9	5.8	5.4	5.4	5.2	5.3	5.2	5.4	5.9
General surgery	15.5	15.8	14.3	14.2	13.8	14.0	13.3	12.9	13.6	13.6	13.6	14.5
Internal medicine	6.4	6.5	6.1	5.5	5.3	4.9	4.8	4.7	5.2	5.1	5.2	5.0
Obstetrics/gynaecology	35.9	35.9	35.5	35.0	34.9	35.3	34.6	34.2	36.1	36.4	37.2	39.8
Paediatrics	7.0	7.0	6.2	5.9	6.0	5.4	5.0	4.7	5.3	5.2	5.3	4.9
Orthopaedic surgery	14.0	14.9	14.8	14.3	14.5	14.1	14.0	14.8	15.2	14.4	14.4	16.1
Otolaryngology	20.9	19.3	19.6	18.5	18.3	17.6	16.6	15.8	16.5	16.0	16.6	17.5
Urology	27.6	29.6	28.5	29.3	28.7	28.6	30.3	28.8	29.1	28.1	28.1	29.3
Anaesthesia	28.3	29.5	28.7	27.6	28.2	28.3	26.9	26.5	29.5	26.8	27.6	29.5
Neurology	6.1	6.0	5.6	6.0	5.5	5.6	5.3	5.5	5.7	5.7	5.7	6.7
Psychiatry	27.3	27.7	28.8	27.5	27.5	27.7	27.6	28.0	29.5	29.8	30.1	30.7
Ophthalmology	27.7	28.4	28.0	27.1	27.4	27.1	26.9	27.4	28.8	27.9	29.1	30.5
Dermatology	4.3	5.8	5.1	6.7	4.1	3.9	4.0	4.0	4.1	4.1	4.1	4.8
Neurosurgery	8.9	9.1	10.7	11.1	11.1	10.5	8.9	7.0	11.8	11.8	12.2	14.6
Plastic surgery	24.7	28.4	27.7	28.9	25.0	22.4	19.0	19.8	22.0	21.1	22.4	24.4
Thoracic surgery	12.5	16.0	18.2	16.7	11.5	11.1	13.3	11.1	20.0	18.5	19.2	17.2
Physical medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
All	11.5	11.9	11.5	11.1	10.9	10.8	10.6	10.3	10.8	10.9	11.1	11.6
Total number of opted-out physicians	1297	1348	1313	1280	1280	1255	1231	1211	1242	1243	1264	1331

– Psychiatry and anaesthesia also had high rates of non-participation, with over one-quarter of the specialists opting-out in each case.
– Urology, ophthalmology, and plastic surgery had relatively high opting-out rates, but general surgery, orthopaedic surgery, otolaryngology, neurosurgery, and thoracic surgery, although they opted out more than the 'average' over-all, did not have extremely high non-participation rates.
– General practice, paediatrics, and the medical specialties (internal medicine, neurology, dermatology, and physical medicine) all had very low opting-out rates.

There are a number of interesting features in the longitudinal data presented in Table 1.

First, internal medicine, paediatrics, and to a lesser extent general practice and dermatology all experienced secular declines in opting-out rates. Probably this can be attributed to almost universal opting-in by new entrants into these specialties, with a stable cohort of established opted-out physicians comprising an ever smaller proportion over time. In general practice and in dermatology, the July 1978 figures indicate a possible reversal in trend, and the escalation in aggregate opting-out rates since then suggests that these rates may indeed be much higher at present. Data were available on aggregate opting-out rates up to April 1979, but only to July 1978 by specialty.

Secondly, there has been a secular upward trend in opting-out rates in psychiatry and ophthalmology, both reaching over 30 per cent by July 1978. In neurosurgery, the number of practitioners is so small that the increase in opting-out from 9.1 per cent to 14.6 per cent between October 1972 and July 1978 reflects only a small absolute change.

Thirdly, in a number of specialties, e.g. obstetrics and gynaecology, plastic surgery, and thoracic surgery, there appears to be a cyclical effect: a high in 1972, a low between 1974 and 1977, increasing again in 1978 (in the surgical subspecialties the number of practitioners is small and the rates unstable).

Fourthly, for the physician population as a whole the rate of opting-out declined somewhat in the first year (from 13.5 per cent in October 1972 to 12 per cent a year later), drifted slowly down over the next four years to a low of 10.3 per cent in July 1977, and rose again the following year. In the last ten months the increase has escalated (as is shown in Table 2) so that, as of April 1979 the opting-out rate stood at approximately 17.8 per cent, about 73 per cent higher than its low twenty-one months earlier.

It should be noted, however, that while opting-out rates declined somewhat over the entire period represented, the absolute numbers of opted-out physicians remained remarkably steady. In July 1978 there were the same

TABLE 2

Opted-out practice in Ontario

	Percentage of total physicians who are opted-out	Percentage of total billings paid on an opted-out basis, i.e. direct to subscribers	Percentage of opted-out physicians with dual practices
October 1972	13.5	12.0	46.6
January 1973	13.5	11.7	49.6
April 1973	12.4	11.6	45.0
July 1973	12.1	11.3	46.4
October 1973	12.0	11.4	47.0
January 1974	12.0	11.2	45.9
April 1974	11.8	11.0	43.3
July 1974	11.7	10.6	40.8
October 1974	11.5	10.4	43.4
January 1975	11.3	10.0	43.6
April 1975	11.3	10.3	42.9
July 1975	11.2	9.8	41.7
October 1975	11.5	9.9	43.6
January 1976	11.9	10.3	42.5
April 1976	11.5	10.2	42.7
July 1976	11.1	9.3	42.3
October 1976	10.9	9.4	44.5
January 1977	10.8	9.7	44.9
April 1977	10.6	9.3	46.9
July 1977	10.3	8.7	45.4
October 1977	10.8	Not available	Not available
January 1978	10.9	Not available	Not available
April 1978	11.1	Not available	Not available
July 1978	11.3	Not available	Not available
October 1978 *	12.8	Not available	Not available
January 1979 *	15.2	Not available	Not available
April 1979 *	17.8	Not available	Not available

* Assumes July 1978 figure for total physician population

number of opted-out physicians as there were in October 1972, although they represented a smaller proportion of the fee-for-service medical population as a whole, which increased by about 16 per cent in the same period. There is some expansion and contraction of the opted-out segment over time, perhaps as some physicians enter the segment but find it too costly to remain (it should be noted also that the size of the billing population as a whole fluctuates on a seasonal basis). While the aggregate data are not definitive on this point, they do suggest that until July 1978 there was a fairly

stable cohort of opted-out physicians and that new entrants into the profession tended overwhelmingly to opt in.

The data discussed above relate to the proportion of physicians in each specialty who have chosen to opt out of the OHIP payment system. As noted above, however, not all of the physicians so counted are exclusively non-participating physicians; there are physicians who have more than one type of practice (such physicians are members of a hospital group practice in addition to having a solo practice), with one or more practices participating in the system and the other(s) opted out. Furthermore, when fully opted-out physicians provide services to treaty Indians, veterans, etc. (the first chapter reviews the full array of exclusions over time) such services are paid only on an opted-in basis, i.e. direct payment from OHIP, and such physicians will thus be counted as having some opted-in practice. This double-counting makes it difficult to interpret the participation rates of Table 1 in isolation.

Table 2 presents additional data which help clarify the situation. One would expect that the OHIP billing volume of opted-out practices would be lower: first, the non-participating option may be taken by some physicians precisely to use the price instrument rather than the generation of higher utilization in attaining income targets; and second, to the extent that in dual practices the opted-out practice is secondary (e.g. a solo, opted-out practice for a physician whose main activity is in an opted-in group), the volume in such practices will be lower than average. The data confirm these hypotheses; the proportion of total OHIP payments made to subscribers (i.e. patients of opted-out physicians) is always lower than the share of opted-out practitioners in the physician population. Furthermore, the share of opted-out payments has declined faster than the proportion of physicians who have opted out; the former dropped 28 per cent between October 1972 and July 1977, while the latter declined by 24 per cent over the same period. The share of the publicly funded market held by opted-out physicians is thus somewhat lower than their proportionate numbers would indicate and was under one-tenth of the total in the last period for which data were available.

The decline in the size of the opted-out market relative to the proportion of non-participating physicians raises interesting questions. There are two possible explanations: either the average size of opted-out practice has declined relative to opted-in practices (at least in terms of OHIP payments), or there has been a trend toward dual practices in which the opted-out component is secondary, or both have occurred. Such a trend would be consistent with efforts by physicians to price-discriminate within the context of the practice-streaming provisions of OHIP since 1972 described above.

Some data allow us to investigate this question further. The third column of Table 2 gives the proportion of opted-out physicians with dual practices over time. This figure is computed by subtracting the total number of physicians in any month from the sum of opted-in and opted-out physicians. The difference, namely those who are double-counted by virtue of having dual practices, is divided by the number of opted-out physicians to give the percentage figure presented in the table. One must first note that this proportion is quite high; indeed almost half of all opted-out physicians are somewhat protected against the vicissitudes of an unenviable competitive position (in general, surrounded by zero-priced providers) by some participation in an opted-in practice. Although some of these may be opted-in only in token amounts through the treatment of treaty Indians, veterans, etc., this is unlikely to be the case for most of the 'dual' practices; an alternative practice route is maintained by many.

The data, however, do not indicate an increasing trend to dual practices. On the contrary, at least from October 1972 to July 1976, it appears that an increasing proportion of opted-out physicians did *not* have any opted-in practice, and thus one cannot explain the falling opted-out share of the market during this period by reference to increasing efforts by opted-in physicians to price-discriminate by setting up peripheral opted-out practices. The alternative explanation, a relative decline in opted-out practices as such, thus appears more plausible. Of course, one can tell a very believable story about why this should be the case. With lower average prices and prices fixed exogenously, we would expect that opted-in physicians would, other things being equal, provide large numbers of services initially and increasingly. With a discretionary price instrument at their disposal, opted-out physicians are not so reliant on generating higher levels of utilization to attain income targets. Moreover, the assumption of other things being equal may be particularly heroic in this case. All other things are unlikely to be equal, particularly in so far as opted-out physicians might have different 'tastes' (distastes?) for utilization-generating practice behaviour. Presumably one of the reasons that some physicians opt out is to enable them to substitute the price instrument for less satisfying ways of generating income, e.g. the 'rapid turnover' approach to patient care.

The data in Table 2 suggest the quantitative importance of the changes in regulations regarding dual practices described in the previous chapter. First, the removal of the 'good Samaritan' clause in 1973 had no apparent effect at all; the dual practice rate declined between January and April of that year, from 49.6 per cent to 45.0 per cent, but the change in the regulation did not occur until June. The 1974 'disenfranchising' of community-hospital opted-out physicians (they lost the right to bill OHIP direct for services provided

through a hospital group) may have had a slight effect. The proportion with dual practices dropped from about 46 per cent to about 43 per cent after April 1974, when the change was introduced. The 1976 change, exempting services provided in nursing homes, children's treatment centres, etc. seems to have had some effect, though it was somewhat delayed. The dual practice rate went from about 42 per cent to about 46 per cent, and simultaneously the percentage of total billings dropped from about 10 to about 9. These two trends together suggest that opted-out physicians took advantage of the new exemptions and transferred some of their workload to an opted-in basis. In general, then, the changes in the regulations seem to have been accompanied by moderate responses on the part of opted-out physicians. The opting-out rates themselves seem to be almost entirely unaffected by the regulatory changes, at least until the December 1978 change regarding community hospital groups. It is too early to assess the impact of this newest regulatory action.

The inferences we have drawn from the aggregate data – the existence of a stable cohort of opted-out physicians and a particular style of practice among them – are interesting and intuitively plausible. In order to investigate these and other hypotheses regarding opted-out physicians more fully, however, we need a data set linked at the individual level, and an organizing theory with which to approach it. The following chapters describe the results of our own survey of physicians, which produced a data base linking data on servicing behaviour drawn from OHIP profiles and on practice and personal characteristics from questionnaires and interviews, all at the level of the individual physician. The fourth chapter elaborates a model of physician behaviour, and the fifth chapter reports a least-squares estimation of this model using our survey data.

3

Descriptive statistics and bivariate analyses

Having reviewed the political history of the option provision and seen what information currently exists about its effects on the provision of medical services in this province, we are ready to discuss the findings of our particular survey. The survey methodology is described in appendix A. Briefly, it involved merging information obtained in interviews with 574 Ontario physicians with practitioner profile data derived from OHIP. The result is an extremely rich data base, comprising not only information on the volume and mix of services provided by physicians but also information on their hours of work, expenses of practice, price structures, and political attitudes – all linked at the level of the individual physician and related to 'biographical' data such as years in practice, specialty, practice setting (solo or group), and so on. The sample was stratified to over-represent rural physicians and opted-out physicians to ensure a sufficient number of observations in each of these distinctive categories. The sample was not stratified by specialty group, since we felt that a random sample would yield sufficient observations in various specialty groups.

THE COMPOSITION OF THE SAMPLE

Included in the original sample of 574 physicians are a number of cases on which we have incomplete data, and the usefulness of these observations is limited to certain types of data analysis. In the first place, there were a number of physicians whose OHIP profiles did not reflect their normal clinical workloads, for a number of the reasons outlined in appendix A (for example, certain physicians had experienced a change in the location or organization of their practice during the period covered by the study; others held institutional affiliations involving the provision of patient care for which OHIP was not billed). For any analysis involving profile data, therefore, such physicians must be excluded, and we are confined to a sample of 420.

In addition the information regarding urban or rural location was lost in thirty-four cases. Where we are required to weight our data to overcome the rural stratification bias, therefore, our sample is further reduced to 386. Unfortunately, even for these 386 cases, we do not have data on all variables. For each variable reported in the tables in this chapter, we have noted the relevant Ns. Incomplete data sets do not raise a great problem in the descriptive statistics presented in this chapter. When we come to the use of multiple regression techniques and to the estimation of a system of simultaneous equations in chapter 5, however, we are technically limited to those cases for which we have complete data, and our sample shrinks further to 309.

The successive attrition of our sample is discussed in appendix A. In general, the refusal rate was low. Of those physicians initially contacted, 31.3 per cent declined to be interviewed and another 6.2 per cent withheld information after the interview. In general, however, our sample is quite representative, in terms of both specialty proportions and clinical workloads. As discussed in appendix A, there is no evidence of any over-all negative response bias on the part of 'busier' physicians with higher OHIP billings. There were significant negative biases in this respect among opted-out general practitioners and opted-in paediatricians and a positive bias among opted-in psychiatrists. To some extent these biases were reduced as our sample was refined, but where they may continue to influence our results we have noted them in our discussion.

The specialty[1] complexion of our sample is set out in Table 3. The apparent over-representation of opted-out psychiatrists can be attributed both to response bias (psychiatrists constituted 14.2 per cent of our original opted-out sample but 18.3 per cent of those opted-out physicians who agreed to participate) and to the exclusion of physicians with unrepresentative profiles. Opted-out psychiatrists seem to be less likely than either other opted-out physicians or opted-in psychiatrists to have institutional affiliations which cloud the relationship of their profiles to their actual workload.[2] Hence their

1 We have grouped together the surgical specialties of general surgery, urology, otolaryngology, ophthalmology, neurosurgery, plastic surgery, and thoracic surgery. Similarly, we have grouped the medical specialties of internal medicine, neurology, dermatology, and physical medicine. Obstetrics and gynaecology, paediatrics, anaesthesia, psychiatry and general practice are reported separately in Table 3. Diagnostic and therapeutic radiologists and pathologists were excluded from our sample, since their OHIP profiles cannot be assumed to represent their clinical workloads.

2 The disproportionate loss of opted-in psychiatrists through the exclusion of unrepresentative profiles may have been an indirect result of response bias. Among those opted-in psychiatrists originally contacted, those who participated in the survey had significantly lower OHIP billings on average ($27 327.59) than those who refused ($39 405.31), as

TABLE 3

Sample distribution by option status and specialty, related to population, November 1975

	Opted-in			Opted-out		
	Opted-in population (%)	Weighted statistics sample (N, %)	Regression sample (N, %)	Opted-out population (%)	Weighted statistics sample (N, %)	Regression sample (N, %)
General practice	54.8	147 (52.7)	127 (55.9)	27.4	27 (25.3)	17 (20.7)
Medical specialties	11.6	21 (7.5)	16 (7.0)	5.5	6 (5.6)	5 (6.1)
Obstetrics/ gynaecology	4.0	10 (3.6)	10 (4.4)	14.3	12 (11.2)	11 (13.4)
Paediatrics	3.9	10 (3.6)	6 (2.6)	2.2	3 (2.8)	2 (2.4)
Surgical specialties	15.1	63 (22.6)[a]	49 (21.6)[a]	25.9	26 (24.2)	19 (23.2)
Anaesthesia	4.1	17 (6.1)	12 (5.3)	10.7	8 (7.4)	6 (7.3)
Psychiatry	5.3	11 (3.9)	7 (3.1)	13.8	25 (23.4)[a]	22 (26.8)[a]
Total	100.0	279 (100.0)	227 (100.0)	100.0	107 (100.0)	82 (100.0)

a Significant difference from population proportion ($p < 0.05$)

NOTE: Since diagnostic and therapeutic radiologists and pathologists were excluded from our sample we also excluded them from the population base upon which opted-in and opted-out percentages were calculated.

proportion in the opted-out sample usable for weighted statistics rises to 23.4 per cent. Furthermore our data sets for psychiatrists appear to be more complete than the average in our sample: the representation in the regression sample (requiring complete data) rises even further to 26.8 per cent. To put these figures another way, while 48.7 per cent of the psychiatrists in our

noted in appendix A. In many cases these low OHIP billings did not reflect clinical workloads, on account of the institutional affiliations of the respondents, and these cases were excluded from the sample. The mean billing of opted-in psychiatrists in our usable sample was $34 166.09. It would appear, then, that among opted-in psychiatrists originally contacted those with institutional appointments were more likely to respond but to be excluded from this analysis.

TABLE 4

Population and sample opting-out rates, by specialty (%)

	Opted-out in Ontario medical population, November 1975[a]	Opted-out in weighted statistics sample (N = 386)[b]	Opted-out in regression sample (N = 309)
General practice	6.1	16.3	11.8
Medical specialties	6.0	28.1	23.8
Obstetrics/gynaecology	35.3	57.1	52.4
Paediatrics	6.9	23.1	25.0
Surgical specialties	19.5	29.6	27.9
Anaesthesia	29.4	32.3	33.3
Psychiatry	27.0	70.0	75.9
All	11.6	29.5	26.5

a Our sample was drawn from the OHIP list of physicians billing in November 1975.
b Weighted to redress rural stratification bias

original sample were opted-out (an understandable proportion, given that we were over-sampling for opted-out physicians), that proportion rises to 54.2 per cent among participants, 70.0 per cent in the sample usable for weighting, and 75.9 per cent in the regression sample!

Our sample also over-represents opted-in surgeons. This is partly a random effect of our original sample (in which they constituted 16.7 per cent of opted-in physicians) and partly a result of the fact that they are more likely to survive the winnowing effect of unrepresentative profiles (they constitute 22.6 per cent of our opted-in sample usable for weighted statistics and 21.6 per cent of the regression sample).

Finally, it is apparent that we somewhat under-represent opted-in medical specialists (although the under-representation is not statistically significant), due to relatively high non-participation rates and to unrepresentative profiles and missing data (medical specialists constituted 10.8 per cent of our original opted-in sample and 9.0 per cent of our opted-in participants, but only 7.5 per cent of our opted-in sample usable for weighted statistics and 7.0 per cent of the regression sample).

Table 4 reports opting-out rates in the medical population and in our sample. By design, these rates are higher in our sample. In the cases of the medical specialists and psychiatry, opting-out rates are further exaggerated by the response biases we have noted. The case of paediatrics, as noted below, should be ignored because of the very small N (13) in this category.

The sample rates in anaesthesia have been somewhat biased downwards by a peculiarity of our coding scheme.[3]

THE CALCULATION OF DESCRIPTIVE STATISTICS

This chapter investigates differences between opted-in and opted-out physicians as indicated by difference-between-means tests. Differences between the means of opted-in and opted-out physicians on a wide range of variables are reported by specialty groups and for the sample as a whole. Although our sample is quite representative, its successive attrition and the breakdown by specialty group have been expensive in terms of degrees of freedom. We can say nothing about the differences between opted-out and opted-in paediatricians, with only three opted-out paediatricians in the sample, and in subsequent tables means for this group will not be reported separately. Furthermore, our observations regarding anaesthetists and medical specialists must be advanced cautiously in view of the small numbers of opted-out physicians in these groups and the response bias just noted in the case of the latter group.

In order that our sample means reflect as nearly as possible the population means, we have used a weighting procedure (see appendix A) to overcome the intentional and unintentional biases in our sample. In the first place our means within each specialty group have been weighted to overcome the stratification bias in favour of rural physicians. Furthermore, in computing means for the opted-in and opted-out samples in general, we have weighted the specialty-specific means by the specialty's representation in the opted-in and opted-out populations. This latter weighting procedure overcomes unanticipated specialty biases in our sample, such as the over-representation of psychiatrists in the opted-out sample.

Even when we have taken account of these biases in our sample, a few comments need to be made about the difficulties in interpreting differences between the means of the opted-in and opted-out samples in general where there are significant inter-specialty differences. In such cases differential opting-out rates across specialties in the medical population itself might either deflate or inflate the apparent difference between opted-in and opted-

3 Eight non-certified anaesthetists (or, put another way, general practitioners limiting their practice to anaesthesia) were coded as anaesthetists, and it is likely that these physicians were opted-in. Accordingly, our sample probably overestimates the size of the opted-in segment of the certified anaesthetist population.

out physicians. To take the most extreme example, technically determined differences between general practitioners, with the lowest opting-out rates, and obstetricians, with the highest opting-out rates, could appear as general differences between opted-in and opted-out physicians, simply because the proportions of general practitioners and obstetricians in the opted-in and opted-out populations are very different. To control for this 'intervening' effect of the specialty variable, we have reported differences by specialty as well as for all physicians. We have also conducted one-way analysis of variance tests[4] to discover significant interspecialty differences within the opted-in and opted-out samples. Where such differences exist and could contribute to over-all differences, we shall note them in the text.

In addition to testing for differences between means of opted-in and opted-out physicians, we have also tested for differences between opted-out physicians themselves according to the level of their prices and to their motivations for opting out. These relationships will be expressed in the form of simple product-moment correlations. Unfortunately we do not have enough cases to calculate these correlations within specialty groups. In making the calculations for the opted-out sample as a whole, however, we weighted the data to overcome the specialty biases in our sample, notably the over-representation of psychiatrists (since there are so few rural opted-out physicians we did not deem it necessary in these calculations to weight the data to overcome the effects of our rural stratification bias).

The statistical analysis presented in this chapter must be treated as preliminary. We are approaching the data here not, as in later chapters, equipped with an organizing theory, but rather in an exploratory spirit. We are interested simply in differences between opted-in and opted-out physicians and among opted-out physicians that are suggested by our data, regardless of the direction of the differences and without controlling for any variables other than specialty group. This chapter, then, highlights 'interesting' differences and sets the context for the more systematic analysis to follow.

The choice of statistical tools reflects this purpose. In general, we report differences significant at the 95 per cent level ($p < 0.05$), that is, differences that would appear in only 5 per cent of the samples drawn from the Ontario medical population if there were no real corresponding differences in that population. We can be 95 per cent confident that these differences in our

4 Using the SPSS program for one-way analysis of variance, we tested whether a significant (at the 95 per cent level) proportion of the variance in our dependent variables was explained by specialty group. In the same pass we also conducted pairwise tests for differences between specialty group means on these dependent variables to determine which particular groups differed significantly from each other.

sample occur also in the population from which it was drawn. This confidence level is fairly standard in social science research. However, we also note differences with a 10 per cent probability of chance occurrence in our sample ($p < 0.10$), reporting such differences in our tables and commenting upon them in the text where they appear to warrant further study. At this early stage of theoretical development in the health care field we feel that it is appropriate to cast our net rather widely. We are prepared to take more than the usual risk of 'false positives' (or 'Type 1 errors') in order to lower the risk of failing to identify real differences in the population ('Type 2 errors'). This is a necessary tradeoff in selecting a confidence level, and we prefer at this stage that our sins be those of commission. We shall, of course, treat our findings where $p > 0.05$ with even more caution than we do our other findings, but they may occasionally suggest intriguing lines of enquiry to our readers, if not to us.

In testing for differences between means we have used a two-tailed test. That is, we have looked for differences between means that are significantly different from zero in either direction. The effect of this choice is to require a higher value of our test statistic (t) in order to have 95 per cent confidence in our results than we would require if we could focus, on theoretical grounds, on only one tail of the sampling distribution. Our exploratory stance therefore has restrictive as well as more liberal implications for our statistical tools.

WHO OPTS OUT?

Ideology versus price

We suggested in chapter 1 that opting out has a symbolic or ideological, as well as a pragmatic economic value. In the first place, physicians may opt out to preserve as individual practitioners a sense of 'independence' from the government plan. As the OMA has argued, physicians may also see opting out as a way of strengthening the medical profession as an organized body in its dealings with government. In either case, opting out becomes a protest against government intervention in the health care field.

On the other hand opting out may have a practical value for the physician in organizing his practice. The way a physician organizes his practice depends upon the value which he attaches to a number of factors – the quality of service he provides, his income, his leisure, conformity with peer norms, independence from formal control, and so on. In achieving an optimal balance among these values the opted-in physician can vary the volume and mix of services he provides and the inputs of labour (his own and his employees') and capital into his practice. But he is constrained by a negoti-

ated fee structure, by the technical nature of his specialty (as noted in chapter 2, for example, anaesthetists and psychiatrists have limited ability to expand their workloads), and by the OHIP-Medical Review Committee review procedure described in chapter 1. The opted-out physician gains a price instrument – he is free from the contraint of the OHIP schedule of payments. He must, however, estimate the risks of losing patients and failing to collect accounts.

Our data suggest that there are, indeed, very different factors which lead physicians to opt out. We asked our respondents to select up to two of the following statements as most closely approximating their reasons for opting out:

(a) To maintain a close doctor-patient relationship;
(b) To help preserve a system of 'private' medical practice outside the government plan;
(c) OMA fee schedule is inadequate;
(d) OHIP proration of OMA fee schedule is inadequate;
(e) Principle of proration is unacceptable;
(f) Patients should be aware of the cost of service;
(g) To preserve a means of protest against government policies.

If a physician selected *only* from responses a, b, e, f, or g, he was classified as having opted out for 'ideological' reasons, and was assigned a score of 1 on our dummy variable IDEOLOGY. If he included c or d among his responses we assumed that he had sought a price instrument, and he was assigned a score of 0 on the IDEOLOGY variable. Just under half (45.6 per cent) of our opted-out respondents fell into the ideological category. Not surprisingly, those who had a price motive for opting out did in fact charge higher prices than those who reported only ideological motives.

The Pearson correlation between the IDEOLOGY variable and price relative to the OHIP benefit was -0.3726 ($p < 0.05$).

Opted-out physicians as a whole hold more 'individualistic' ideological positions than do opted-in physicians. But, contrary to our expectations, the ideology behind opting out is not significantly more 'anti-government' than is that of the medical profession as a whole (see Table 5). Opted-out physicians are more likely to report themselves as holding views which are more 'conservative' than those of the OMA regarding change in the delivery of health services; they are less likely to report themselves as holding more 'liberal' views. (The latter finding is significant within the general practitioner and surgery groups as well as for the opted-out sample as a whole.)

TABLE 5

Ideological components by option type and specialty group: percentages

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anes-thesia	Psychiatry	All
Classifying themselves as more 'liberal' than OMA (LIBERAL)[a] (N=386)	In	34.5	30.9	39.1	39.7	28.5	52.2	35.8
	Out	14.1	16.7	33.3	16.4	25.0	24.0	19.4
Significant differences[b]		* *			* *			* *
Classifying themselves as more 'conservative' than OMA (CONS) (N=386)	In	10.4	10.2	19.6	14.1	17.1	0	10.9
	Out	25.4	16.7	25.0	28.8	37.5	12.0	25.3
Significant differences		*						* *
Believing that medical profession should have more power than at present in planning delivery of health services (MEDPWRD) (N=385)	In	56.8	49.4	39.1	51.4	34.2	38.2	52.4
	Out	63.4	50.0	66.7	49.5	75.0	36.0	56.1
Significant differences								
Believing that government has too much power in planning health services (GOVPWRD) (N=386)	In	74.3	79.4	48.9	66.9	68.5	90.4	73.8
	Out	78.8	50.0	58.3	62.9	75.0	84.0	69.4
Significant differences								
Believing that MRC has too much power (LESSMRC) (N=371)	In	14.1	15.4	19.5	11.1	12.1	4.5	13.7
	Out	22.9	50.0	16.7	17.5	12.5	12.0	19.0
Significant differences								

a In this and subsequent tables, variable labels will be indicated in parenthesis. For a fuller description of these variables refer to appendix C.

b In this and subsequent tables double asterisks indicate significance at the 95 per cent confidence level, and a single asterisk indicates significance at the 90 per cent confidence level.

But our opted-out sample is no more likely than the opted-in to feel that government has too much power in the health care field (indeed, it is less likely to hold this attitude, although the difference between samples is not significant).

The ideology behind opting out should be interpreted in the light of our more general analysis[5] of ideological data from this survey, which suggests that self-reported conservatism vis-à-vis the OMA taps an individualistic attitudinal factor. Self-reported 'conservatives' are less likely to favour larger scales of organization for health service delivery, involving expanded roles for paraprofessionals and changes in modes of remuneration. Self-reported 'liberals' on the other hand consistently favour such increases in scale, but this liberal-conservative dimension is not related to attitudes toward government. We had expected that opting out would reflect an anti-government as well as a pro-individualism statement; apparently only the latter is the case. It may be, of course, that the 'safety valve' has worked, that opted-out physicians, having registered their protest and/or availed themselves of a price instrument, have relieved some of their hostility toward government.

Whether physicians opt out for ideological or financial reasons, we would expect them to disapprove of the power of the Medical Review Committee. For the ideologues, the MRC stands as a symbol of the 'standardization' of medical practice, as part of a review procedure setting arbitrary limits to medical practice. For other physicians the MRC presents a practical problem, limiting the volume of service for which they can receive OHIP remuneration and hence encouraging them to resort to the price instrument. We do find that opted-out physicians are more likely than opted-in physicians to feel that the MRC is too powerful, but the difference as measured by a difference-between-means test is not statistically significant. Again, we may be seeing something of a safety valve effect, or it may be that more subtle analytical techniques are necessary to capture these attitudinal effects. We shall return to these issues in chapter 5.

We also investigated attitudinal differences between the opted-out physicians, according to whether or not their decision to opt out was ideologically motivated and according to their price levels. Table 6 reports these relationships in the form of correlations. Not surprisingly, those who opted out for

5 A preliminary discussion of ideological data is presented in Wolfson, Tuohy, and Shah (1978), and these findings tend to corroborate Tuohy's earlier work (Tuohy, 1974, 1976b).

TABLE 6

Correlations among ideological attitudes, option status, ideological motivation, and price

Dummy variables indicating respondent holds following attitudes:	IDEOLOGY[a]	PRICE[b]
Respondent classifies self more liberal than OMA (LIBERAL)	−0.0276 (N=119)	0.0172 (N=121)
Significance		
Respondent classifies self more conservative than OMA (CONS)	0.1491 (N=119)	−0.0712 (N=121)
Significance	*	
Medical profession should have more power than at present in planning health services (MEDPWRD)	0.0969 (N=118)	−0.1718 (N=120)
Significance		* *
Government has too much power at present in planning health services (GOVPWRD)	0.0536 (N=115)	−0.0738 (N=117)
Significance		
MRC has too much power (LESSMRC)	−0.0221 (N=119)	−0.1542 (N=121)
Significance		* *

a Dummy variable indicating opted out for ideological reasons (see appendix C)
b Price as percentage of OHIP benefit (see appendix C)

ideological reasons are more likely to report themselves as conservative (though not significantly less likely to report themselves as liberal). Put another way, there is some evidence that medical conservatives who opt out are more likely to do so for ideological reasons. Liberals who opt out on the other hand are as likely to have a financial as an ideological motivation. And those who opt out for ideological reasons are no more or less opposed to government intervention than other opted-out physicians and are no different in their attitudes towards the power of the medical profession or that of the MRC.

Pricing policies do appear to be related to specific political attitudes. Those who charge higher prices are less likely to champion the cause of increasing

TABLE 7

Proportion of peers opted out by option status and specialty

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaes-thesia	Psychiatry	All
Percentage of physicians in respondent's county opted-out[a] (CPCTOUT 1) (N=386)	In	8.42	11.82	6.66	9.47	14.68	13.46	9.52
	Out	12.88	15.00	15.19	13.42	16.04	16.77	14.51
Significant differences		* *	*	* *	* *		*	* *
Percentage of physicians in respondent's specialty and county opted-out[b] (CPCTOUT) (N=386)	In	5.00	4.02	19.12	14.11	24.76	26.36	8.48
	Out	7.53	18.62	55.55	35.75	30.85	45.39	29.40
Significant differences		* *	* *	* *	* *	*	* *	* *

a Excluding respondent from numerator and denominator. In some cases the base area is larger than the county (see appendix C: variable CPCTOUT 1).

b One of nineteen specialties as defined by OHIP, not specialty *group* as defined in this study (see appendix C: variable CPCTOUT).

the power of the medical profession and are less likely to disapprove of the power of the MRC. This finding suggests a refinement of our safety valve hypothesis: it may be that it is the vigorous use of the price instrument, and not the act of opting out in itself, which dissipates the desire for greater medical power and for freedom from MRC supervision. This argument appears particularly plausible in the case of attitudes to the MRC. It may be that those who exercise the price instrument are less likely to resent the perceived constraints imposed by the MRC on their use of other economic instruments, constraints which may have caused them to resort to the price instrument in the first place.

Peer support

Peer support appears to be of considerable importance to a physician's option decision. When specifically asked 21 per cent of our opted-out respondents reported that the OMA had been influential in their decision to opt out, and 37 per cent reported influence from peers (some respondents may have given both responses). While these responses suggest only moderate peer influence, the behavioural data are more striking and demonstrate that opted-out physicians tend to 'cluster.'

As indicated in Table 7, our opted-out respondents were located in counties with significantly larger concentrations of opted-out physicians than were our opted-in respondents, a phenomenon that emerges even more sharply when concentrations of opted-out physicians within particular specialties are considered. This finding holds true in all specialty groups except anaesthesia.

Another way of presenting this clustering phenomenon is to note that for any given county and specialty the opting-out rate is likely to be considerably higher or considerably lower than the provincial average for that specialty. In some specialties this clustering effect is considerably more pronounced than in others, as Table 8 illustrates. For example, the provincial opting-out rate for obstetrics and gynaecology was 36.7 per cent, but our opted-out obstetricians were located in counties where, on average, 55.6 per cent of their peers had opted out. Opted-out psychiatrists and surgeons are similarly clustered; but the county means for anaesthesia and general practice are close to the provincial average. Opting-out rates in counties in which our opted-out medical specialists are located are notably higher than provincial averages, but the rates in this specialty group are low enough that these practitioners still face a very heavily opted-in peer group. In general, it may also be that clustering occurs on a base more local than the county – specifically, on a hospital base – but our data are inadequate to demonstrate such clustering. If that is the case, Table 8 may well underestimate the degree to which opting-out is concentrated locally.

TABLE 8

Opting-out rates as of April 1974 for specialties and counties in opted-out sample

Specialty groups	Average percentage of physicians opted out in respondent's specialty and county (CPCTOUT) (N=122)	Percentage of physicians opted out in respondent's specialty: province-wide (PPCTOUT) (N=122)
General practice	7.5	6.0
Medical specialties	18.6	7.2
Obstetrics/ gynaecology	55.6	36.7
Surgical specialties	35.7	20.2
Anaesthesia	30.9	28.0
Psychiatry	45.4	27.5

NOTE: County data were unavailable after April 1974.

TABLE 9

Peer support: correlations of option status, ideological motivation, and price with percentage of peers opted out

	Ideology	Price
Percentage of physicians in respondent's county opted out (CPCTOUT 1) (N=121)	−0.2403	0.1618
Significant differences	* *	* *
Percentage of physicians in respondent's specialty and county opted out (CPCTOUT) (N=121)	−0.3071	0.1741
Significant differences	* *	* *

NOTE: For asterisks see Table 5, note *b*.

Table 9 suggests that the extent of peer support varies according to the motivation to opt out – ideological or financial. The negative correlations between ideological motivation and the peer support variables suggest that the size of the local opted-out segment is smaller for 'ideologues' than for those who opt out for financial reasons (Table 9, column 1). This may suggest that opting out for financial reasons is likely to be a group decision, whereas decisions to opt out for ideological reasons are more likely to be

TABLE 10

Group membership by option status and specialty group.

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Percentage of respondents who are members of income- and expense-sharing groups (GROUPDUM) (N=386)	In	20.0	15.4	29.3	12.6	40.0	38.2	20.0
	Out	5.6	0	16.7	8.2	75.0	8.0	14.6
Significant differences		* *				*	*	
Percentage of respondents who are members of multi-specialty groups (MIXGROUP) (N=386)	In	10.9	0	0	6.1	11.4	19.1	10.5
	Out	1.3	0	0	12.3	12.5	4.0	5.2
Significant differences		* *						* *

NOTE: For asterisks see Table 5, note *b*.

made individually. The finding of smaller concentrations of 'ideological' opted-out physicians, of course, may also provide another reason for their relatively lower prices: not only is price not a major factor in their option decision but also, in a competitive environment of opted-in physicians, their prices are held down. As the second column of Table 9 suggests, the ability to charge higher prices is related to the size of the opted-out segment of the medical market in which a physician operates.

As a final point regarding peer support, it is interesting to note the relationship of group practice to opting out. A priori it is difficult to predict the direction of this relationship. On one hand since they are more likely to embrace an individualistic ideology, one might expect opted-out physicians not to be attracted to group practice. On the other hand group practice provides a useful vehicle for the enforcement of a collective price structure. One might expect, then, to find differences within the opted-out sample (with 'ideologues' less likely, and those charging higher prices more likely, to be in groups). Differences between opted-out and opted-in physicians as a whole would be indeterminate.

In fact (Table 10), we find that, except in the case of anaesthesia, opted-out physicians are less likely to be in groups, although the differences are significant only in the cases of general practice and possibly psychiatry. The unexpected finding in the case of anaesthesia is probably an artifact of our data.[6] Multispecialty groups, where a common price structure is less relevant, are significantly less popular with opted-out physicians in general, and particularly with opted-out general practitioners. However, our a priori speculations about the different implications of ideological and price motives are not borne out; the correlations of group membership with ideological motivation and price are very weak and insignificant.

Interspecialty differences

The findings above are important to understanding the interspecialty differences in opting-out rates. We suggested earlier that the technical and economic characteristics of certain specialties might in themselves lead physicians to opt out for financial reasons. Psychiatrists and anaesthetists, we suggested, have relatively little power to increase the volume of their practices endogenously and therefore might be more likely to opt out to gain a price instrument. Specialties such as obstetrics, which face largely exogenous and episodic demand for their services, might be similarly motivated. And

6 We believe that certified anaesthetists in general are likely to practice in groups, but the inclusion of several opted-in general practitioners in this category (see note 3) reduces the group practice proportion of our opted-in anaesthetist sample.

TABLE 11

Relative financial status, opting-out rates, ideological motivation, and price by specialty group

	Average OHIP bills relative to grand mean (RELPOV)[a]	Percentage opted out[b]	Price as percentage of OHIP benefit (PRICE)[c]	Percentage opting out for ideological reasons (IDEOLOGY)[c]
General practice	0.81	6.1	118.78%	56.3%
Medical specialties	1.08	6.0	109.43	60.0
Obstetrics/ gynaecology	1.01	35.3	120.28	33.3
Surgical specialties	1.20	19.5	116.89	62.4
Anaesthesia	0.78	29.4	109.59	66.7
Psychiatry	0.60	27.0	135.35	16.7
All		11.6	116.44[d]	49.9[d]

a Calculated from population data, April 1974
b Calculated from population data, November 1975
c Calculated from sample data (N=122)
d Weighted to reflect specialty composition of population

those specialties that (whether because of the structure of the OMA fee schedule or because of limited discretion over demand or both) have relatively lower OHIP billings on average might be expected to seek a price instrument.

For general practitioners these factors might operate in different directions. Their relatively greater discretion over demand would imply low opting out rates, while their generally lower fees as per the OMA schedule might lead them to seek a price instrument. Since they offer care on a continuing basis, however, they are more vulnerable to the deterrent effect of price.

A comparison of the columns of Table 11 sheds some light on these specialty effects. The first column reports the ratio of average billings in each specialty group to the average for all physicians. (These ratios were calculated from OHIP data for the entire opted-in billing population for April 1974; see appendix C, variable RELPOV.) The other columns report opting-out rates in the population and reasons for opting out and price indices as determined from our sample data.[7]

7 These findings are reported primarily to indicate the relative positions of our specialty groups, although there are some significant differences worth noting. The average billing ratio for psychiatry was significantly lower (at the 95 per cent level) than that of any

Psychiatrists, who are indeed at significant disadvantage in terms of their OHIP billings and have little discretion to increase those billings, opt out for financial reasons and have price indices significantly higher than other specialty groups. Obstetricians, whose billings are significantly lower than those of other surgical specialties but close to the grand mean, also opt out for financial reasons and charge prices that are high relative to all specialty groups except psychiatry. General practitioners rank third, both in financial motivation and in price. A substantial proportion of opted-out general practitioners appear to have judged that, even given their discretion over volume, the OMA fee structure necessitates resorting to a price instrument. As we shall see, this is a costly decision for general practitioners; the average professional incomes of opted-out general practitioners are significantly lower than those of opted-in general practitioners.

The case of anaesthesia is surprising, given our earlier discussion: anaesthetists charge relatively lower prices and are most likely to be ideologically motivated. One would have expected a type of physician constrained in the economic instruments at his disposal and relatively disadvantaged in his OHIP billings to be energetic in his use of price. Furthermore, one would not have expected a type of physician who functions within the context of a relatively large-scale institution, the hospital, to be so strongly motivated by an individualistic ideology. Let us suggest the following possible explanations for these anomalies. It may be that, although anaesthetists, with their limited discretion over their workload, need a price instrument, they are limited in their ability to use it. Anaesthetists are rarely chosen by individual patients; they are most often selected by referring surgeons, who may not want to face the complaints of their patients about the excessive prices of the anaesthetists they have selected. The strong ideological orientation found among our opted-out anaesthetists, may be attributable to the presence of a large proportion of British physicians in this segment of our sample (62.5 per cent, as compared with a sample mean of 20.1 per cent) for whom memories of the National Health Service may still rankle.[8] Finally, our findings on opted-out

other specialty group. The ratios for anaesthesia and general practice were significantly higher than the psychiatry ratio but significantly lower than those of obstetrics and medical and surgical specialties. Finally, the obstetrics ratio was not significantly different from the medical specialties ratio but was, as noted in the text, significantly lower than that for the surgical specialties. There are no significant interspecialty differences in propensity to opt out for ideological reasons, and only one in the case of price: the price index of psychiatrists is significantly higher than that of any other specialty group.

8 The correlation between being born in Britain and opting out for ideological reasons within the entire opted-out sample is 0.1213 ($p < 0.10$).

anaesthetists must be treated with a caution appropriate to the small number of observations (eight) in this category.

In general, opted-out physicians in specialties with relatively low average OHIP billings are more likely to have opted out for financial reasons and to charge higher prices. For each of our respondents, as noted, we calculated a RELPOV value, which is the ratio of the average OHIP billings of opted-in physicians in his specialty to the grand average. The correlation of this RELPOV variable with our IDEOLOGY variable is 0.137, $p < 0.10$. In other words, the higher his RELPOV value, the more likely an opted-out physician is to have made his decision for ideological and not for financial reasons. Similarly, the higher his RELPOV value, the lower is an opted-out physician's price ($r = -0.2429$, $p < 0.05$).

Market power

Whatever his motivation, a degree of market power appears to have some importance in enabling a physician to opt out, particularly if he is a general practitioner. The average opted-out general practitioner has a longer-established practice than does his opted-in peer (Table 12). He is also more likely than the opted-in general practitioner to be a Canadian citizen and to be located in a high average income county.[9]

Given the low opting-out rates in general practice, the opted-out general practitioner faces considerable competitive pressure. As we shall see, opting out tends to be a costly decision for general practitioners, at least in terms of their professional income. Among general practitioners, then, it appears to be those who are most firmly established, with a patient population willing to bear out-of-pocket costs for medical service, who are willing to take the financial risks of opting out.

There are some indications that opted-out specialists enjoy more market power than their opted-in colleagues. Surgeons and psychiatrists are more likely to have part-time teaching appointments, which may signify peer approval, and hence quality, to their patients. (On the other hand this finding may simply reflect the increased incentive for teaching physicians to opt out. At the time of the study, as noted in chapter 1, opted-out physicians practising in a registered medical group associated with a medical school were exempt from 'practice-streaming' requirements, in that they were allowed to submit bills through the group direct to OHIP while maintaining an opted-out

9 Average family income is of course not a measure of supply-side market power, but since we have few demand-side measures it is included in this section.

TABLE 12

Market power indicators by option type and specialty group

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Mean years in practice	In	16.5	15.9	19.7	15.2	16.7	17.4	16.4
(YRSPRAC) (N=382)	Out	21.9	15.5	16.0	18.8	14.4	9.4	17.2
Significant differences		* *					* *	
Mean years in practice in present locality	In	11.7	11.8	14.1	11.9	11.8	7.6	11.7
(YRSLOCAL) (N=382)	Out	18.2	12.7	10.0	14.9	8.5	5.8	13.1
Significant differences		* *						
Percentage who are Canadian citizens	In	84.4	93.7	98.0	94.1	85.0	80.9	87.2
(CITIZEN) (N=384)	Out	95.8	83.3	75.0	95.8	75.0	92.0	89.8
Significant differences		* *	* *					
Average family income respondent's county --	In	10 846.15	11 117.94	10 470.16	10 890.62	11 251.21	11 168.72	10 698.27
means (AVINC) (N=386)	Out	11 009.07	11 632.83	10 835.08	11 208.22	11 428.62	11 529.64	11 197.94
Significant differences		* *						* *
Percentage with full-time teaching appointments	In	0	15.5	9.7	16.4	11.4	47.7	7.5
(FULLTIME) (N=386)	Out	0	0	8.3	8.2	25.0	12.0	7.3
Significant differences							* *	
Percentage with part-time teaching appointments	In	7.5	41.2	19.5	21.3	11.4	9.5	15.8
(PARTTIME) (N=386)	Out	19.6	66.7	41.7	41.8	37.5	40.0	36.8
Significant differences					*		* *	* *
Average waiting time in days for appointment in	In	3.7	18.9	19.3	14.1	N/A	21.5	8.4
non-urgent situation (QUEUE) (N=381)	Out	6.6	12.4	29.0	21.2	N/A	14.9	14.4
Significant differences		*						* *

NOTE: For asterisks see Table 5, note *b*.

private practice – an arrangement which could afford considerable protection against bad debts.)

In some other specialities market power appears quite irrelevant to the option decision. Indeed, opted-out psychiatrists have been in practice for fewer years on average than opted-in psychiatrists. Given the high opting-out rate in this specialty group, the average opted-out psychiatrist will feel considerably less competitive pressure than the opted-out general practitioner, and market power may therefore be less important to his option decision.

The broad differences between opted-in and opted-out physicians deserve comment. Opted-out physicians in general, for example, are significantly more likely to be located in richer counties. This finding holds across all specialty groups, as well, although it reaches statistical significance only in the case of general practice. There are no significant interspecialty differences on this variable. Opted-out physicians as a whole are also more likely to have part-time teaching appointments, a finding that again holds true across all specialty groups but reaches significance only within surgery and psychiatry. Again, there are no significant interspecialty differences on this variable within the opted-out sample.[10] Here again we may be seeing the effects of an increased incentive for teaching physicians to opt out, since they retain the option to bill OHIP for some patients through teaching-hospital-based groups. It is notable that our data suggest that almost 45 per cent of opted-out physicians had teaching affiliations, most of whom could be presumed to be associated with a registered teaching-hospital-based group. We do not know, however, the extent to which such physicians actually billed OHIP through these groups.

Finally, opted-out physicians as a whole have longer 'queues' than opted-in physicians. Whereas a patient can on average see an opted-in physician in a non-urgent situation within 8.4 days of the time at which he requests an appointment, the waiting time to see an opted-out physician is on average 14.4 days. The fact that patients are willing to wait longer for the services of opted-out physicians may be a reflection of the greater market power of these physicians. The over-all effect here may be somewhat amplified by interspecialty differences, however. General practitioners, with low opting-out rates, have the shortest queues. Surgeons, obstetricians and psychiatrists,

10 Within the opted-in sample, medical and surgical specialists are significantly more likely than general practitioners to have a part-time teaching appointment, but given the similar opting-out rates for general practitioners and medical specialists it is unlikely that specialty accounts for the difference between the in and out samples.

conversely, have higher opting-out rates and queues significantly longer than those of general practitioners. The shorter queues of the opted-in population, then, may be due at least in part to its higher proportion of general practitioners. Furthermore, the finding of longer queues for opted-out physicians does not hold true within all specialties. Only in general practice is it significant, and then only at a 90 per cent significance level.

THE EFFECTS OF OPTING OUT

Price, market power, and product differentiation

We have already suggested that the price of an opted-out physician's services is influenced by his motivation for opting out and his competitive environment, and that these factors vary across specialties. Let us now consider other factors that may influence his price.

We have discussed a physician's market power as a factor enabling him to opt out (that is, to charge a non-zero price); it does not, however, enable him to charge higher prices than other opted-out physicians (Table 13). Indeed, we find a strong negative correlation between years in practice and price.

It may be that the 'years in practice' variable reveals, not a market power, but an ideological effect. Whether this is so will become more apparent in our multivariate analysis of these variables in chapter 5. One of our other indicators of market power – the length of the queue – is correlated with price, though only at a 90 per cent significance level. Part-time teaching physicians, interestingly, charge prices neither higher nor lower than those of other opted-out physicians. One might have hypothesized that their ability to bill OHIP for less affluent patients through the teaching group would reduce risks of non-collection and hence reduce the need to charge higher prices to more affluent patients to cover bad debts. On the other hand we have assumed that an appointment to a medical faculty increases a physician's market power, enabling him to charge higher prices. Whether or not these factors cancel each other out, a part-time teaching appointment seems to have little effect on an opted-out physician's price.

Although the relationship between market power and price is weak, other characteristics of the market itself appear important in enabling the charging of higher prices. We saw earlier (Table 9) that a physician's price is significantly correlated with the percentage of his peers who are opted out. Here we see that average income in his county is also a significant factor.

Apart from the absolute level of prices, one aspect of pricing behaviour emerges strikingly from our survey. The great majority of opted-out physi-

TABLE 13

Correlations of market power indicators with price

	PRICE (as percentage of OHIP benefit)
Years in practice (YRSPRAC) (N=117)	−0.2473
Significance	* *
Years in practice in present locality (YRSLOCAL) (N=117)	−0.2517
Significance	* *
Average family income in respondent's county (AVINC) (N=121)	0.2455
Significance	* *
Part-time teaching appointment (PARTTIME) (N=121)	−0.0256
Significance	
Waiting time in days for appointment in non-urgent situation (QUEUE) (N=121)	0.1292
Significance	*

NOTE: For asterisks see Table 5, note *b*.

cians price-discriminate: that is, they adjust their prices according to their estimate of the patient's ability to pay. Eighty-five per cent of our respondents reported that they followed this policy, a proportion that does not vary significantly across specialties.

Finally, there is some evidence in our data that opted-out physicians 'differentiate their products' in order to demand prices above the OHIP benefit, although this evidence is difficult to interpret. We developed a measure of the 'complexity' of a physician's practice, that is, the extent to which he provides services provided by relatively few other physicians (see appendix C: variable COMPLEX). On this measure, anaesthesia and surgery are significantly more complex than other specialties. We developed another measure of the concentration of a physician's practice, this one relating the extent to which a physician concentrates upon particular age-sex categories of

patients (see appendix C: variable SPECASEX). On this measure, of course, paediatrics ranks highest, followed by obstetrics and gynaecology. Anaesthesia and psychiatry are significantly more age-sex specialized than general practice, although internal medicine and surgery are not.

On these measures a few notable differences emerge between opted-out and opted-in physicians within certain specialty groups (Table 14). Opted-out general practitioners are more age-sex specialized than are opted-in general practitioners. It may be that some opted-out general practitioners concentrate upon the provision of 'family medicine' to relatively young families rather than 'general medicine' to individuals of all ages. Others may have primarily geriatric practices, while yet others may concentrate on managing stress in individuals in certain critical phases of the life cycle such as middle age. There is considerable scope within general practice for such patterns of concentration, and opted-out general practitioners may be differentiating their products in such ways.

Among the medical specialists and psychiatrists, where one might expect to find some similar patterns of concentration, age-sex specialization is higher among opted-out physicians (although the difference is significant only for psychiatry). On our measure of *complexity* on the other hand, opted-out medical specialists are actually less complex in their practice than their opted-in peers.

The over-all differences between opted-in and opted-out physicians in terms of complexity and age-sex specialization may be due, at least in part, to different opting-out rates across more or less complex or age-specialized specialty groups. For example, obstetrics and gynaecology, anaesthesia, and psychiatry, with high opting-out rates, are in general significantly more age-sex specialized than is general practice with a low opting-out rate. Therefore, the opted-out medical population may have more age-sex specialized practices partly because of the higher proportion of specialists among the opted-outs. The finding regarding complexity is less easily explained away. On the one hand anaesthesia, a highly complex specialty, has high opting-out rates, while general practice, with low complexity, has a low opting-out rate (an interspecialty difference which would lower the opted-in mean relative to that of opted-out physicians). On the other hand psychiatry ranks fairly low in complexity and high in opting-out (an interspecialty difference which would lower the opted-out mean relative to the opted-in). These countervailing effects make interpretation difficult. In short, there may be some product differentiation on the part of opted-out physicians in terms of the complexity of service they offer, but our data are at best suggestive on this point.

TABLE 14

Indicators of product differentiation by option type and specialty group: means

Respondents	Options status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Complexity (COMPLEX)	In	0.59	1.10	0.93	1.26	1.61	0.88	0.81
(N=386)	Out	0.64	0.74	1.02	1.35	1.45	0.91	0.99
Significant differences			* *					* *
Age-sex specialization (SPECASEX)	In	0.64	1.42	2.63	1.00	1.00	1.52	1.07
(N=386)	Out	1.08	2.21	3.29	0.98	0.79	2.35	1.73
Significant differences		* *					* *	* *

NOTE: For asterisks see Table 5, note *b*.

We do find a significant correlation of price with the age-sex specialization ($r = 0.2115$, $p < 0.05$), but not with the complexity measure. It must be kept in mind, however, that the heavy representation of the highly priced and age-sex-specialized psychiatry group in the opted-out population contributes strongly to this finding.

Utilization[11]

Different patterns of utilization between opted-in and opted-out physicians, as reported in Table 15, are best discussed within the context of particular specialty groups. The confounding effect of differential opting-out rates across specialties, given significant interspecialty differences on measures of total patient loads, referrals, complementary services, and workload, makes it difficult to interpret the differences which emerge between opted-in and opted-out physicians as a whole.

The patient loads of opted-out general practitioners, medical specialists, and psychiatrists are markedly smaller on average than those of their opted-in counterparts. Opted-out psychiatrists appear to compensate by servicing their smaller patient loads more intensively: their average dollars-per-patient ratio is markedly higher than in the case of opted-in psychiatrists, and their OHIP billings are marginally higher[12] (the wide variance in patient loads and dollars-per-patient ratios among psychiatrists reduces the statistical significance of these differences). Opted-out general practitioners also appear to compensate somewhat for smaller patient loads with somewhat higher dollars-per-patient ratios, but even so their OHIP billings are less than those of opted-in general practitioners. Opted-out medical specialists on the other hand have not only smaller patient loads but also lower dollars-per-patient ratios, and consequently lower OHIP billings. Opted-out surgeons have mar-

11 It is likely that our yearly estimates of total billings and total laboratory work are biased downwards, since they are based on a nine-month period which excludes the heavy service months of February, March, and April. We chose to use the nine-month period May to January so that our service data would be based on a constant fee schedule and their interpretation not be complicated by the effects of the fee schedule change in May 1975.

12 The difference between opted-in and opted-out psychiatrists is consistent with our earlier hypothesis that psychiatrists are constrained in their ability to exercise discretion over the volume of service they provide by the fact that they 'sell time.' Opted-out psychiatrists, with the smaller patient loads, are freer than their opted-in peers to increase the volume of service they provide to each patient before running up against similar time constraints. As we shall see below, the working hours per week of opted-out and opted-in psychiatrists are not significantly different (although opted-out psychiatrists appear to take more holiday weeks per year).

TABLE 15

Utilization variables by option type and specialty group: means

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Discrete patient load Sept. 1975 to Jan. 1976 (TOTPAT) (N=386)	In	1334.08	1073.28	754.21	930.96	465.08	321.92	1147.73
	Out	796.93	763.83	718.75	1079.24	595.50	124.28	760.24
Significant differences		* *	* *					* *
OHIP billings May 1975 to Jan. 1976 (TOTDOL) (N=386)	In	44 852.17	67 277.87	53 623.60	59 353.03	51 677.35	34 166.09	49 653.51
	Out	29 128.50	42 882.50	55 045.50	71 542.00	42 075.00	37 532.40	47 087.65
Significant differences		* *	* *		* *			
$ value of OHIP billings per patient, Jan. 1976 (DOLPRPAT) (N=386)	In	12.74	32.39	31.14	38.98	45.37	66.85	23.27
	Out	18.43	24.75	36.99	39.18	45.14	92.67	39.52
Significant differences			* *					* *
Estimated 12-month total $ value of lab and x-ray tests ordered (TESTS) (N=385)	In	25 155.25	21 361.62	7834.23	8687.64	1907.88	1366.80	19 261.07
	Out	21 408.78	19 295.58	10 262.98	5669.76	509.56	194.74	10 631.18
Significant differences								* *
$ value of referred services, May 1975 to Jan. 1976 (REFS) (N=386)	In	4599.39	1763.98	3226.17	1074.34	210.81	1163.32	3392.72
	Out	3828.64	2371.83	2475.83	1424.24	993.50	698.16	2320.41
Significant differences								* *

NOTE: For asterisks see Table 5, note *b*.

ginally larger patient loads and dollars-per-patient ratios than opted-in surgeons; and when these factors combine to produce OHIP billings the results are significantly higher for opted-out surgeons.

In general, our findings bear out and cast some light upon Wolfson's earlier findings regarding the utilization of opted-out physicians' services (Wolfson, 1975, 1976). Again, among general practitioners we find opting out to be associated negatively with patient load and positively with dollars-per-patient. From a financial point of view, however, higher dollars-per-patient ratios do not compensate for smaller patient loads: the OHIP billings of opted-out general practitioners are significantly lower than those of their opted-in peers.[13] We also find significantly smaller patient loads and higher dollars-per-patient ratios among opted-out physicians as a whole. However, some of these overall results seem attributable in part to interspecialty differences. The finding of smaller patient loads among opted-out physicians does not appear to be an artifact of interspecialty differentiation; it occurs in most (but not all) specialty groups, and the patient loads of obstetricians and surgeons, with high opting-out rates, do not differ significantly from those of general practitioners and medical specialists, with low representation in the opted-out population (it is true, however, that the patient loads of psychiatrists, with their high propensity to opt out, are indeed significantly lower than those of general practitioners).

The higher dollars-per-patient ratio among opted-out physicians, however, seems to reflect interspecialty differences more strongly. In both opted-in and opted-out samples, general practice, with the lowest opting-out rate, has a dollars-per-patient ratio significantly lower than those of surgery, anaesthesia, and psychiatry, which have high opting-out rates. Differences in dollars-per-patient do occur, as noted, within specialty groups – but the only significant difference, in the case of the medical specialists, runs counter to the general finding of higher ratios for opted-out physicians.

With respect to generated services – referrals and tests – it is particularly difficult to parcel out the effects of technical differences among specialties from the effects of opting out. Opted-out physicians on average order significantly fewer laboratory tests from other providers in the health system. However, no significant differences emerge within specialties (despite the

13 The lower OHIP billings of the opted-out general practitioners may be partly a result of response bias. Our non-respondent opted-out general practitioners, on average, had OHIP billings significantly higher ($31 179.95) than did those opted-out general practitioners who responded ($25 723.88). Nonetheless, even the average billings of our non-respondent opted-out general practitioners are significantly lower at the 90 per cent level than those of the opted-in general practitioners who participated in our survey ($42 464.99).

TABLE 16

Correlations of utilization variables with price and ideological motivation

	PRICE as percentage of OHIP benefit (N=121)	IDEOLOGY dummy variable (N=119)
Discrete patient load, Sept. 1975 to Jan. 1976. (TOTPAT)	−0.1970	0.1612
Significance	* *	* *
OHIP billings, May 1975 to Jan. 1976 (TOTDOL)	−0.1572	0.0377
Significance	* *	
Estimated $ value of lab and X-ray tests ordered, Jan. 1975 to Jan. 1976 (TESTS)	−0.1426	0.1020
Significance	*	
$ value of referred services, May 1975 to Jan. 1976. (REFS)	−0.0095	0.0681
Significance		

NOTE: For asterisks see Table 5, note *b*.

significant differences in patient loads noted earlier), and the direction of the difference is not consistent across specialties. Contributing to the total difference is undoubtedly the relatively low volume of testing in the highly opted-out specialties of anaesthesia and psychiatry, and the high volume in general practice – a finding which reflects in part the scale effect of patient load. The significantly lower over-all referral rates for opted-out physicians may similarly reflect the relatively higher referral rates in general practice as compared to anaesthesia, psychiatry, and surgery. Again, there are no significant intraspecialty differences, despite differences in patient load, and the effects of opting-out on referrals seem to vary across specialties.

Price and ideology appear to have some effect on these utilization variables as well, although we suspect that here the effect of ideology simply reflects a negative price effect. The data in Table 16 could be interpreted as suggesting that the key effect of price is in reducing patient loads – its deter-

rent effect. From this would follow the negative relationship between price and OHIP billings, and that between price and the value of laboratory tests and X-rays ordered, as scale effects of these smaller patient loads.

However, interpreting the apparent relationship of price to patient loads, volume of billings, referrals, etc. within the opted-out population is complicated by the same interspecialty differences which make it difficult to interpret the relationship of option status itself to these variables (and we do not have sufficient observations to test for the effect of price within specialty groups). Psychiatrists, with the highest prices, have the smallest patient loads; internists, with relatively low prices, have relatively large patient loads.

Whether a physician is opted in or out, then, appears to make some difference to the absolute level of his patient load, service volume, and (possibly) referrals and tests. Is it also reflected in a comparison of his practice with those of his peers? Earlier studies (Wolfson, 1975; Tuohy, 1975) have suggested that the practice characteristics and attitudes of physicians in the same medical community tend to be alike. The extent to which this homogeneous behaviour is simply a response to similar environmental conditions or is mutually reinforcing is not clear, although both factors appear to be at work. Some of the differences between opted-out and opted-in physicians may be attributable to the medical communities themselves, such as the proportion of the local peer group which is opted-out: as we have seen, the degree of peer support, whether it is social, political, or economic, seems to be related both to the option decision and to the price charged. We would expect utilization patterns to be related to peer group norms as well.

For each respondent we computed the ratio of his patient load, OHIP billings, and referrals for January 1976 to the average January patient loads, OHIP billings, and referrals in his specialty in his county (see appendix C: variables EMPATR, EMBILLR, EMREFSR). We would expect a comparison of these ratios for opted-in and opted-out physicians to yield somewhat different results than our earlier comparison of absolute levels. In the first place, to the extent that opting out is clustered, that is, the more an opted-out physician's local peer group is opted out and an opted-in physician's local peer group is opted in, we would expect to find fewer differences in peer group ratios between ins and outs than in absolute utilization levels. In psychiatry and surgery (specialty groups with considerable clustering) then, we might expect to find less marked differences in ratios than we found in absolute levels (opting out in obstetrics and gynaecology is also clustered, but we have not found significant differences between opted-in and opted-out obstetricians).

A second effect of comparing peer group ratios rather than absolute levels is to control for the effect of specialty in comparing the in and out samples in general, since peer groups are defined only within specialties. Some of our earlier problems of interpretation will therefore not be so pronounced in the following discussion.

The first striking feature of Table 17 is the extent to which our sample, particularly our opted-in sample, is drawn from physicians with heavier-than-average fee-for-service workloads. This result is not surprising – full time fee-for-service physicians are more likely to have survived the successive attritions of our sample than are those in part-time fee-for-service practice (see appendix A).

The use of ratios does tend in some cases to mute the differences between opted-in and opted-out physicians; in other cases the direction of the difference changes. Opted-out general practitioners are again seen to have smaller patient loads than opted-in general practitioners, even when the measure of patient load is made relative to their local peer group average. Our earlier finding of a significant difference in patient loads between opted-in and opted-out medical specialists on the other hand disappears in the case of patient load ratios. Opted-out medical specialists seem to be located in areas where the average patient loads of their peers are relatively small, perhaps in part because of local clustering among opted-out medical specialists. In the case of surgery our earlier finding of larger patient loads among opted-out surgeons is reversed: the patient loads of opted-in surgeons are slightly larger, relative to local norms, than those of opted-out surgeons. However, differences in both absolute levels and ratios within the surgery group are slight and of very low statistical significance. Interestingly, we again find significantly smaller patient loads among opted-out physicians as a whole. The ratio measure, of course, controls for specialty group, so that this finding cannot be attributed to the intervening effect of specialty. Opted-out physicians do have smaller patient loads, compared to their local peers, than opted-in physicians.

The pattern of differences in billing ratios is somewhat different than when absolute levels of billing are considered. The difference within the general practice group is again significant at the 95 per cent level, but the differences within the medical and surgical specialties are less significant. Surprisingly, the difference in billing between opted-out and opted-in psychiatrists is more marked and more statistically significant when peer group ratios, rather than absolute levels, are compared. Given the considerable local clustering of opting-out withing psychiatry, we would have expected peer group ratios in the opted-in and opted-out psychiatry samples to be similar. It may be that in

TABLE 17

Relation of selected utilization variables to peer group norms, by option status and specialty groups: means

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Ratio of respondent's patient load to average for his specialty and county, Jan. 1976 (EMPATR) (N=386)	In	1.29	1.18	1.14	1.09	1.72	1.18	1.26
	Out	0.78	0.99	0.91	1.02	1.09	1.01	0.96
Significant differences		* *						* *
Ratio of respondent's OHIP billings to average for his specialty and county, Jan. 1976 (EMBILLR) (N=386)	In	1.25	1.40	1.01	1.12	1.53	1.08	1.25
	Out	0.82	0.98	0.98	1.19	1.07	1.27	1.05
Significant differences		* *	*				*	* *
Ratio of respondent's $ value of referrals to average for his specialty and county, Jan. 1976 (EMREFSR) (N=386)	In	1.30	1.48	2.92	1.17	1.27	1.64	1.39
	Out	0.95	2.33	1.22	1.47	1.11	1.34	1.33
Significant differences		* *						

NOTE: For asterisks see Table 5, note *b*.

the counties in which opted-out psychiatrists are clustered opted-in psychiatrists have extraordinarily low OHIP billings. Why this should be so is not clear, and since the difference in peer group ratios is significant only at the 90 per cent level we should not strain unduly to explain it.[14]

Undoubtedly the most striking effect of comparing peer group billing ratios, rather than absolute levels of billing, however, is in the over-all difference between opted-in and opted-out physicians. When absolute billings were compared (Table 15), no significant difference was found, and we suggested that interspecialty differences made the over-all finding difficult to interpret in any event. Peer group ratios, as noted, control for the specialty effect and ought therefore to be more meaningful. It is therefore particularly noteworthy that in general the ratios of the billings of opted-out physicians to the billings of other physicians in their county and specialty are significantly lower than are such ratios for opted-in physicians. On a measure which controls for specialty effects, in short, the billings of opted-out physicians are on average significantly lower than those of opted-in physicians. While this result may well flow from smaller patient loads, it is nonetheless worth noting in itself.

Finally, when ratios are considered the lower referral rates of opted-out physicians in general are revealed to be largely, though not entirely, the result of specialty as an intervening variable. The difference in referrals virtually disappears; on average, the referral rates of opted-out physicians bear the same relation to local peer norms as do those of opted-in physicians. A significant difference occurs only in the case of general practice, where opted-out general practitioners do much less referring, relative to other general practitioners in their counties, than opted-in general practitioners do. This is an understandable result, despite our earlier findings suggesting that the referral rates of opted-out general practitioners are not significantly lower in absolute terms than those of their opted-in counterparts. Opted-out general practitioners are more likely to be located in heavily urbanized counties,

14 As suggested in note 2 above, opted-in psychiatrists are more likely than opted-out psychiatrists to have institutional appointments through which they receive non-OHIP remuneration for a significant amount of their professional workload. The OHIP profiles of opted-in physicians will therefore report workloads that are, on average, considerably smaller than those of opted-out psychiatrists. Such institutionally based psychiatrists were excluded from our sample as having unrepresentative profiles. However, they were included in OHIP's calculation of the county averages for psychiatry which appear in the profiles of our respondents. If there are some counties in which the psychiatrist population is segmented into an opted-in and institutionally based category and an opted-out private practice category, we would expect the high peer group ratios for opted-out psychiatrists which we observe in our data.

with high specialist/population ratios, where referral rates for general practitioners are higher than average; hence the low referral rates of opted-out general practitioners are thrown into sharper relief. These low referral rates in turn are understandable; opted-out general practitioners have significantly smaller patient loads than their opted-in counterparts and, as we shall see, are most likely to suffer financially from their option status. They are less likely than their opted-in peers to risk losing patients through referral. The surprisingly large referral ratio in the cases of opted-out medical specialists and opted-in obstetricians should be discounted; there are wide variations around these means, as reflected in the fact that the intraspecialty differences in these cases are not statistically significant.

One further aspect of utilization deserves some comment, although our data in this area are necessarily more impressionistic. Given the widespread interest in the charges of opted-out physicians as a form of deterrent fee, it is relevant to ask what kinds of demands for service are thus inhibited. Are patients of opted-out physicians less likely to make unnecessary or 'frivolous' demands? Conversely, are they more likely than the patients of opted-in physicians to be deterred from seeking care when it is needed? There is some evidence in our survey to support each of these propositions. We asked our respondents what proportion of their patients sought medical care without medical cause, as well as what proportion whould have sought care sooner than they did. The results are reported in Table 18.

Opted-out physicians as a whole do report significantly less frivolous use of their services, a finding which also holds true among general practitioners and psychiatrists (hence the over-all difference cannot be attributed to interspecialty differences). Unaccountably, opted-out obstetricians report a greater frequency of frivolous demand than their opted-in peers, although the difference is significant only at the 90 per cent level. In addition, among opted-out physicians as a group we find some weak evidence to suggest that the charging of higher prices is associated with a lower reported frequency of frivolous demand ($r = -0.1314$, $p < 0.10$). Even this rather weak finding, however, may be largely attributable to the effect of the psychiatry group, with the highest prices and the lowest reported frequency of frivolous demand within the opted-out population.

Table 18 also suggests that opted-out physicians are more likely to report that their patients wait too long before seeking medical help. This finding, however, does not emerge in a statistically significant way in any particular specialty group (although the differences within general practice and psychiatry are notable). It may therefore be largely attributable to the heavy representation of psychiatry, with a reported frequency of delay significantly

TABLE 18

Reported proportion of patients seeking care without medical cause or later than medically indicated by option status and specialty group (means)

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Reported proportion of patients seeking care without medical cause (ABUSE) (N=379)	In	13.2	7.8	7.5	12.9	N/A	9.2	11.5
	Out	7.6	6.3	14.3	15.8	N/A	2.3	8.3
Significant differences		* *		*			* *	* *
Reported proportion of patients seeking care later than medically indicated (TOOLATE) (N=379)	In	9.7	10.9	9.4	7.9	N/A	23.0	10.1
	Out	14.0	10.0	7.2	10.3	N/A	34.5	13.4
Significant differences								* *

NOTE: For asterisks see Table 5, note *b*.

higher than any other specialty, within the opted-out population. Similarly, within the opted-out segment the finding that price is positively associated with reported delay by patients in seeking care ($r = 0.1969$, $p < 0.05$) may be largely attributable to the high frequency of patient delay reported by the highly priced psychiatry group.

Payoffs to physicians

1 Income

The monetary costs and benefits of opting out are best treated by specialty group, since they are so heavily influenced by the OMA fee schedule, whose effects vary across specialties. Table 19 reports gross practice income, total practice expenses, and net practice income across specialty groups. The gross practice income variable was computed (see appendix C: variable GPY) by multiplying nine-month total OHIP billings[15] by the price index (which meant simply multiplying by 1 in the case of opted-in physicians) and deflating the result by the reported proportion of uncollected accounts. The proportion of uncollected accounts was of course zero for opted-in physicians. The average for opted-out physicians was 4.0 per cent – a rather low figure, and one that suggests that bad debts do not contribute heavily to the financial risks of opting-out. The total income figure obtained through the above calculations was multiplied by 12/9, to put it on a twelve-month basis. Our measure of gross practice income, it should be noted, does *not* pick up income from uninsured services nor of course from non-clinical activities. Furthermore, our annual income figures somewhat underestimate the true values, not only because of the exclusion of income from services not covered by OHIP, but also because they are extrapolated from nine-month service volumes which exclude the heavy service months of February, March, and April. It should also be noted, of course, that these income figures are based on the 1975 schedule of reimbursement, which rose 8.1 per cent in 1976, 6.5 per cent in 1977, 6.25 per cent in 1978, and 6.6 per cent in 1979.

The practice expenses given in Table 19 are simply total annual practice expenses as reported by the respondent. Net practice income is the residual when practice expenses are subtracted from gross practice income. For purposes of comparison we have reported the gross professional income means for those 339 cases for which we have full income and expense data.

15 For physicians in group practices with income-sharing arrangements, OHIP billings may provide an accurate indication of workload but only an estimate of income. We do not believe, however, that using OHIP billings as a base for computing income introduces any systematic bias into our results regarding differences between opted-in and opted-out physicians.

TABLE 19

Income and expenses of practice by option type and specialty group: means

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Gross income from medical practice (GPY) (N=339)	In	61 859.02	93 925.25	71 319.25	79 244.50	70 392.94	44 798.53	67 898.62
	Out	47 238.66	58 590.36	84 616.31	98 635.37	59 765.50	62 547.52	70 011.25
Significant differences		* *	* *		* *		* *	
Practice expenses (EXPENSES) (N=339)	In	22 724.00	26 273.49	23 316.66	21 353.14	7581.91	10 807.48	21 809.95
	Out	23 971.76	22 074.17	32 653.91	27 914.76	7198.68	18 413.45	23 789.17
Significant differences					* *		* *	
Practice expenses as a percentage of gross practice income (REXPGPY) (N=339)	In	36.74	27.97	32.69	26.95	10.77	24.12	32.12
	Out	50.75	37.67	38.59	28.30	12.04	29.44	33.98
Significant differences		* *	*					
Net income from medical practice (NPY) (N=339)	In	39 135.02	67 651.75	48 002.68	57 891.42	62 811.06	33 991.05	46 088.73
	Out	23 266.89	36 516.20	51 962.42	70 720.69	52 566.82	44 134.07	46 222.08
Significant differences		* *	* *					

NOTE: For asterisks see Table 5, note *b*.

As Table 19 indicates, the financial effects of opting out vary considerably across specialties. The net incomes from medical practice of opted-out general practitioners, medical specialists, and anaesthetists are lower than those of their opted-in counterparts; in obstetrics and gynaecology, surgical specialties, and psychiatry, opted-out net incomes are higher. Only in general practice and medical specialties are these differences statistically significant; but it ought to be noted that in these two groups, which account for about one-third of the opted-out population, the differences are striking.

The reasons for these different net outcomes can be traced through our data. Let us first consider general practice and medical specialties. We have seen that the clinical workloads of opted-out physicians in these two groups, as reflected in their patient loads and their OHIP billings, are significantly smaller than the workloads of their opted-in counterparts. It is now apparent that these smaller workloads result in lower gross practice incomes, even after price has been taken into account. Furthermore, the proportion of gross practice income which goes to practice expenses is significantly higher for these two groups of opted-out physicians than it is for their opted-in peers. The effect of these proportionately greater practice expenses is to make the relative position of opted-out general practitioners and medical specialists even less favourable in net than in gross terms. The case of general practice is particularly startling. There are a number of possible explanations for the apparent low relative incomes and the very high proportionate practice expenses for opted-out general practitioners. One explanation may be that these differences are exaggerated by our data. Our gross professional income measure, in excluding uninsured services, may underestimate the true value. But why this latter explanation would be more true of opted-out general practice than of other specialty groups is not clear. Another possible explanation of low gross incomes – the hypothesis that expenses incurred by problems of collection and bad debts are greater in general practice than in other specialties – is not borne out by our data; opted-out general practitioners on average report a loss rate of 4.39, only slightly above average and less than that reported by obstetricians. In general, we believe that our data indicate a true income difference between opted-out and opted-in general practitioners (see n.13). The high proportionate practice expenses of opted-out general practitioners suggest that there are substantial fixed costs to general practice, so that physicians with smaller workloads have proportionately higher expenses.

On the basis of our data it is reasonable to say that opted-out general practitioners and medical specialists have smaller patient loads, lower OHIP billings, higher prices, lower gross incomes from medical practice, propor-

tionately higher practice expenses, and lower net incomes from medical practice than their opted-in counterparts. In the case of these two groups the charging of prices above the OHIP benefit appears to be a financially costly decision. We suspect that general practitioners are most likely to suffer a reduction in exogenous demand by opting out, since they offer care on a continuing rather than an episodic basis and to families rather than to individuals. Facing such risks, moreover, most general practitioners do not opt out, and those who do are therefore subject to considerable competitive pressure. Medical specialists (particularly internists), to the extent that they function as primary care or family physicians, may face similar problems.

Interesting differences also arise in the surgical specialties and psychiatry. In these specialty groups the gross professional incomes of opted-out physicians are significantly higher than those of opted-in physicians. In the case of surgery this higher gross income can be attributed in part to the significantly heavier workload (defined in terms of OHIP billings) of the opted-out surgeon. In the case of psychiatry, where opted-out and opted-in workloads vary negligibly, the difference in gross income is largely attributable to price.[16] Once we compute income net of practice expenses, however, the significance of the income difference between opted-in and opted-out physicians in the surgery and psychiatry groups drops below the 90 per cent level. At first this reduction in significance appears surprising, since proportionate practice expenses in these two groups do not differ significantly. On closer examination these statistical effects are due to the considerable variance in practice expenses; the computation of net income thereby results in a variable whose variance about its mean is greater than in the case of gross income. In short, while the differences between the mean net incomes of opted-in and opted-out physicians in surgery and psychiatry remain notable, the relatively greater variance about these means renders these differences less statistically significant than the differences in gross income.

Regardless of these statistical problems, however, several aspects of the surgery and psychiatry data are notable. One is the net income level of opted-out surgeons, which is significantly higher than that of opted-out general practitioners, medical specialists, and psychiatrists (there are no significant net income differences among specialty groups in the opted-in sample). The

16 See above, note 2. In the population the average OHIP billings and therefore possibly the incomes of opted-in psychiatrists may be somewhat higher than in our sample. However, as noted earlier, most of the response bias within the opted-in psychiatry group was probably removed by excluding unrepresentative profiles from the usable sample.

TABLE 20

Hours of work by option type and specialty group: means

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Reported hours per week in patient care (PATHOURS)	In	47.85	43.60	40.28	44.36	45.29	38.70	46.19
(N=381)	Out	41.32	47.33	45.75	44.47	41.38	42.88	43.69
Significant differences		* *						*
Reported hours per week in non-clinical professional	In	8.63	17.36	14.57	12.19	10.38	10.72	10.79
activities (OTHRHR 1) (N=381)	Out	7.00	15.00	11.50	11.82	9.38	12.12	10.54
Significant differences								
Sum of reported hours in patient care and non-clinical	In	56.49	60.97	54.85	56.54	55.67	49.42	56.97
professional activities (SUMHOURS) (N=381)	Out	48.32	62.33	57.25	56.29	50.75	55.00	54.23
Significant differences		* *						*
Reported over-all estimate of hours worked per week	In	49.43	56.62	49.77	49.92	45.89	46.10	50.11
(REPHOURS) (N=381)	Out	44.15	52.00	46.83	53.47	45.50	48.84	48.56
Significant differences		* *						
Hours per week adjusted for reporting bias	In	47.91	54.97	46.25	47.85	45.10	45.63	48.53
(TOTHOUR 1) (N=381)	Out	42.91	51.67	46.08	50.79	42.75	48.60	47.13
Significant differences		* *						

TABLE 20 Continued

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Weeks worked per year (WEEKS) (N=381)	In	48.37	46.99	46.83	47.83	45.10	48.38	47.95
	Out	48.15	46.83	47.50	47.37	46.37	46.88	47.40
Significant differences							* *	* *
Hours per week adjusted for reporting bias and holiday time (TOTHOUR 2) (N=381)	In	44.61	49.66	42.66	44.06	40.24	42.42	44.86
	Out	39.86	46.35	42.06	46.35	38.20	43.85	43.01
Significant differences		* *						

NOTE: For asterisks see Table 5, note *b*.

other is the level of practice expenses for opted-out psychiatrists. It is difficult to explain practice expenses of over $18 000 (almost 30 per cent of gross income) in a specialty which does not require multiple waiting rooms, expensive diagnostic or therapeutic equipment, or paraprofessional manpower.

In one aspect of income and expenses the opted-out and opted-in samples can be meaningfully compared. The proportion of gross practice income taken up by practice expenses is not significantly higher for opted-out than for opted-in physicians. In general, then, it would appear that opting out does not impose higher administrative costs on physicians.

2 Leisure

There are potential payoffs, other than income, deriving from the option decision. One of these is leisure, or at least time to pursue non-clinical activities. Before reporting our hours of work data, however, a few words need to be said about the way in which they were collected. We wished to guard against the natural human tendency to overestimate hours of work. In order to adjust for this reporting bias we asked our respondents to report their total hours of work and also to report hours in work in a set of exhaustive categories, such as patient care in the office, in the hospital and in the home, teaching and research, administration and paperwork, and so on. We then took as total hours of work either the reported total or the sum of the component parts, whichever was less. For comparative purposes, we then deflated this adjusted average work week figure by the holiday time taken by physicians.

Table 20 reports these various measures of working hours. Comparing rows 3 and 4 reveals a general tendency to over-report the components of one's work week (SUMHOURS) relative to over-all time estimates (REPHOURS). The difference is about 13.7 per cent for opted-in physicians and about 11.7 per cent for opted-out physicians. To some extent these difficulties may be due to the fact that some respondents, despite instructions to the contrary, did not treat the component categories as mutually exclusive. One hour spent in clinical teaching, for example, might have been reported twice – once as a patient care hour and again as a teaching hour. In most but not all cases then, the lower figure, the figure we used in computing the adjusted means, was the over-all time estimate. The adjusted hours of work figures (TOTHOUR 1) are close to the over-all time estimates; the adjustment for reporting bias reduces over-all estimates by about 3 per cent for both opted-in and opted-out physicians.

Given this general tendency to over-report components of the work week, reported hours in patient care (PATHOURS) and in non-clinical activities (OTHRHR 1) are likely to overestimate the true values. The only significant

difference in hours of work between opted-in and opted-out physicians occurs in the case of reported hours of patient care; opted-out physicians work fewer patient care hours. This finding is true for the sample as a whole (at $p < 0.10$) and for opted-out and opted-in general practitioners (at $p < 0.05$). The over-all difference cannot be attributed to the intervening effect of specialty, because there are no significant interspecialty differences in patient care hours, even given significant differences in patient loads (indeed, the over-all correlation between patient care hours and patient load is significant, but only moderate: $r = 0.25$, $p < 0.05$). There are no significant differences in non-clinical hours worked (OTHRHR 1); and when clinical and non-clinical hours are summed (SUMHOURS) the significant differences apparent are attributable to differences in patient care hours.

Interestingly, when over-all estimates of working hours are considered (REPHOURS) only one significant difference appears: opted-out general practitioners again report working fewer hours than the opted-in general practitioners. The difference between opted-in and opted-out physicians as a whole is in this case insignificant. We noted earlier that opted-in physicians over-report the components of their work week relative to their over-all estimates to a somewhat greater degree than do their opted-out colleagues. This tendency may account for the fact that the difference between the over-all estimates reported by both groups is less significant than the difference between the summed hours they report. When reported hours of work are adjusted for reporting bias as described above (TOTHOUR 1), only one significant difference again appears – the difference among general practitioners remains significant. When holiday time as such is considered (WEEKS), it appears that opted-out physicians as a whole report more holiday tme in terms of weeks per year than do opted-in physicians, a finding which also holds true within the psychiatry specialty group.

Finally, we developed a measure combining hours and weeks worked by simply multiplying the adjusted hours per week figure by the ratio of weeks worked to fifty-two. This measure is more meaningful in relative than in absolute terms. On this combined measure (TOTHOUR 2) there is no general difference between opted-in and opted-out physicians. Moreover, there is no longer a difference between psychiatrists, and a significant difference between general practitioners reappears.

Opted-out general practitioners appear to be taking some of the reduction in their gross professional income in the form of leisure; opted-out psychiatrists appear to benefit in both income and leisure terms. It is interesting to note the different forms in which this leisure is taken. Opted-out general practitioners take their leisure in the form of hours a week; opted-out psychiatrists take it in the form of weeks a year. The psychiatrists, however,

TABLE 21

Correlations of working hours with price and ideological motivation

	PRICE (N=121)	IDEOLOGY (N=119)
Weeks worked per year (WEEKS)	−0.0610	0.0070
Significance		
Hours worked per week, adjusted for reporting bias and holiday time (TOTHOUR 2)	−0.1806	0.1980
Significance	* *	* *
Hours worked in patient care per week, adjusted for holiday time (HOURS)	−0.1622	0.1770
Significance	* *	* *

NOTE: For asterisks see Table 5, note *b*.

compensate by working longer weeks; on the measures combining hours and weeks there is no difference between opted-in and opted-out psychiatrists. The difference between general practitioners and psychiatrists may simply reflect the greater ability of psychiatrists to schedule their practices. It may be, as well, that opted-out psychiatrists, with more leisure at their disposal, also have higher net incomes than their opted-in colleagues; they are therefore more likely than opted-in psychiatrists to take blocks of vacation time involving travel. Opted-out general practitioners on the other hand have lower net incomes than opted-in general practitioners and take leisure in less extended periods.

In the opted-out sample as a whole, higher prices are associated with shorter work weeks and fewer patient care hours (Table 21). As noted above, there are no interspecialty differences which would account for this effect. Patient load, however, may be an intervening variable; as we saw earlier it is associated moderately negatively with price and moderately positively with patient care hours. The correlation between ideological motivation and working hours may reflect simply a negative price effect.

3 Independence

Opting out has another reward for those physicians who object to the power of the Medical Review Committee, whether as a symbol of government

TABLE 22

Influence from Medical Review Committee and patient 'harassment' by option type and specialty group

Respondents	Option status	General practice	Medical specialties	Obstetrics/ gynaecology	Surgical specialties	Anaesthesia	Psychiatry	All
Percent reporting great or moderate influence from MRC (INFMRCD) (N=384)	In	38.76	26.83	29.33	38.33	45.71	47.75	37.17
	Out	22.54	50.00	25.00	24.73	12.50	40.00	25.67
Significant differences		*				*		* *
Index of patient harassment (HARASS) (N=379)	In	71.86	17.61	58.66	36.39	11.43	66.85	56.08
	Out	47.83	66.67	16.67	37.63	0.0	44.00	35.32
Significant differences		* *	* *	* *				* *

NOTE: For asterisks see Table 5, note *b*.

encroachment or as a constraint upon their OHIP billings. On the whole they are significantly less likely than opted-in physicians to feel a great or moderate amount of influence from the Medical Review Committee over their practices, and there are no significant interspecialty differences (Table 22). Those who charge higher prices are more likely to feel influence from the MRC ($r = 0.2054$; $p < 0.05$); those who opted out for ideological reasons are less likely to feel such influence ($r = -0.2066$; $p < 0.05$). The relationship of price to perceived MRC influence is rather surprising in light of our earlier observation that price is *negatively* correlated with disapproval of the MRC's power. (Indeed, in general, perceived influence from the MRC is not significantly correlated with disapproval of the MRC's power.) This apparent anomaly may admit of the following explanation. It would appear that the extent to which a physician disapproves of the MRC's power depends, among other things, on the extent to which he is able to compensate for MRC constraints on his practice by charging higher prices (as will be recalled from Table 6). On the other hand, ironically, it is just those physicians who are most sensitive to the constraints of the MRC who are likely to have resorted to the price instrument in the first place, as the above correlation would suggest (again, ideology may be picking up a negative price effect).

Clearly, however, there are inter-relationships among these variables deserving more systematic treatment, and we shall return to these issues in the next two chapters.

4 Harassment

Opted-out physicians may be able to use price to screen 'problem patients' out of their practices. We developed an index of 'harassment' based on the frequency with which physicians reported seeing various types of problem patients (see appendix C: variable HARASS). Opted-out physicians as a whole feel significantly less harassed on this measure than do opted-in physicians (Table 22). This also holds true within the specialty groups of general practice and obstetrics and gynaecology. Opted-out medical specialists, however, are more likely to feel harassed by their patients than are their opted-in counterparts. This might be due in part to the fact that the price barrier for the services of medical specialists is lower than it is for any other specialty group. Only anaesthetists have prices as low – and their patients are not likely to be troublesome! Within the out sample as a whole, however, price is not significantly correlated with harassment. If problem patients are deterred by a price barrier, the height of that barrier appears to make little difference.

Among opted-out physicians with their generally lower levels of harassment no significant interspecialty differences occur. Among opted-in physi-

cians, however, general practitioners and psychiatrists report significantly more frequent contact with demanding patients than do medical specialists, paediatricians, surgeons, or anaesthetists.

SUMMARY

In general, we have seen that opted-out physicians tend to cluster together and locate in richer counties; and may be more likely to differentiate their products than their opted-in colleagues. They have smaller patient loads but possibly higher dollars-per-patient ratios. Perhaps as a scale effect of smaller patient loads they do less testing and referring. They charge prices on average 16.4 per cent above the OHIP benefit, and the vast majority price-discriminate. They report on average fewer frivolous demands for their services, but also a somewhat greater tendency for their patients to delay too long before seeking medical care. On average, their incomes are not significantly lower, nor are their practice expenses higher. They do, however, appear to benefit in other ways: they take more leisure and feel less influence from the MRC and less harassment from their patients.

This general profile of opted-out physicians, however, varies considerably across specialties and according to the reasons for opting out. Opting out may be motivated by an individualistic ideology, as well as by a desire to gain a price instrument. These motivations characterize different specialties and appear to affect both practice behaviour and also the returns from opting out. Let us consider various specialty groups in turn.

The incentives facing general practitioners in making the option decision are mixed. On one hand they may judge the use of a price instrument to be particularly risky. We have suggested that because they offer care on a continuing rather than an episodic basis and to families rather than to individuals in many cases they are most likely to suffer a reduction in exogenous demand by opting out. Furthermore, they have more discretion than most specialists to adjust their practice behaviour, increasing the volume or changing the mix of services in response to economic factors and may therefore feel less need for a price instrument. On the other hand the income effect of practice volume and mix is subject to the constraint of the OMA fee schedule, by which general practitioners have historically felt disadvantaged compared to specialists (although this relative disadvantage has been considerably redressed in recent years).

On balance, few general practitioners opt out, but those who do are likely to have more market power than their opted-in peers. Whether or not because of the competitive pressure they face, their patient loads are signifi-

cantly smaller and result in significantly lower referral rates, but not, interestingly, in significantly lower rates of testing. Despite some evidence that opted-out general practitioners offer a more specialized 'product' (by concentrating their practices upon certain age-sex categories of patient) at a higher price, their smaller patient loads result in smaller workloads and lower gross professional incomes than those of opted-in general practitioners. Perhaps reflecting these smaller patient loads, the proportional practice expenses of opted-out general practitioners are greater than those of their opted-in peers. Together these factors make for lower net practice incomes. Although they suffer in income terms, opted-out general practitioners do enjoy the non-monetary benefits we noted for opted-out physicians as a whole: they take more leisure and feel less influence from the MRC and less harassment from their patients.

The only other specialty group described in this chapter with opting-out rates as low as general practice, that is, the medical specialists, seems to indicate a similar pattern of advantage and disadvantage. Opted-out medical specialists face considerable competitive pressure; although somewhat clustered together, they still form a small minority among their peers. Whether because of this pressure or because their motivations are more likely to be ideological, opted-out medical specialists charge prices lower than any specialty group except anaesthetists. But patients or referring physicians may still be deterred – opted-out medical specialists have significantly smaller patient loads. And, as in the case of general practice, these smaller patient loads translate into lower gross professional incomes, higher proportional practice expenses, and lower net professional incomes. Unlike general practitioners, medical specialists do not appear to enjoy non-monetary benefits of opting out: they take no more leisure when they opt out, experience no less influence from the MRC, and feel more harassed by their patients!

In the specialty group with the highest opting-out rate, obstetrics and gynaecology, we find, surprisingly, virtually no significant differences between opted-in and opted-out physicians. Obstetricians opt out in local clusters primarily for financial reasons, and the percentage difference between the prices of opted-out obstetricians and those of their opted-in colleagues is higher than in any other specialty group except psychiatry. Nonetheless, they suffer no significant reduction in patient load, and their servicing behaviour, income, and expenses of practice are not significantly different from those of opted-in obstetricians. It would appear that price does not have a deterrent effect for obstetrical services, which are offered during episodes which are emotionally charged (and have been decreasing in number in the average woman's life!). The considerable variation among obstetricians within both

the opted-in and the opted-out samples must also be noted. Even where differences between means for opted-in and opted-out obstetricians appear striking, the large variances render the differences statistically insignificant.

Opted-out surgeons appear to use both price and volume instruments. Their price indices are in the mid-range among our specialty groups, and their workloads as indicated by their OHIP billings are significantly higher than those of opted-in surgeons (apparently the deterrent effect of price for the services of surgeons, who again offer care on an episodic basis, is negligible, or at least is overcome by the greater market power of opted-out physicians as indicated by the greater likelihood that they hold a teaching appointment). These higher volumes and prices result in higher gross professional incomes; but given the variation in these incomes and in proportional practice expenses the difference between the net incomes of opted-in and opted-out surgeons is less significant. Their higher gross professional incomes (24 per cent higher on average than those of opted-in surgeons) can be largely attributed to their heavier workloads (20 per cent higher). Surgeons opt out on a fairly clustered basis, but politics as well as economics seem to be motivating these local groups – over 60 per cent of opted-out surgeons do so for ideological reasons; and, as noted, their price indices on average are lower than those in the other highly clustered specialties of obstetrics and psychiatry. However, the interpretation of one of these results is complicated by the fact that surgery is a composite category, comprising specialties with very different opting-out rates in the medical population, and hence possibly different motivations, and degrees and kinds of discretion.

Anaesthetists, despite their limited discretion in servicing, do not appear to opt out for financial reasons. They report ideological motivations: they do not cluster disproportionately in local groups to support prices (although, since the over-all opting-out rate for anaesthetists is rather high, price support is available without local clustering). Furthermore, the price indices of opted-out anaesthetists are relatively low. In general, opted-out anaesthetists do not seem to differ from their opted-in peers in their practice behaviour, or in the income, leisure, independence, and non-harassment rewards. We have speculated that anaesthetists may be constrained in their servicing behaviour by their relationship to referring physicians.

The psychiatry specialist group is a particularly interesting case. It is the only specialty in which opting out in itself appears to be profitable in both income and leisure. Psychiatrists opt out in locally clustered groups and overwhelmingly for financial reasons. The price indices of opted-out psychiatrists are significantly higher than those of any other specialty group in our sample. The deterrent effect of these prices is unclear: on average, opted-out psychia-

trists have smaller patient loads than opted-in psychiatrists, but there is wide variation in the sizes of psychiatric patient loads, and these differences are not statistically significant. Opted-out psychiatrists also appear to offer more differentiated products, if age-sex specialization of patient loads can be taken as an indication. Despite smaller patient loads the gross professional incomes of opted-out psychiatrists are significantly higher than those of their opted-in peers, but given the remarkably high reported practice expenses of the former the difference in net income is not significant. There is also a leisure benefit from opting out: opted-out psychiatrists work fewer weeks per year than opted-in psychiatrists.

In interpreting these results we can only speculate on the basis of impressionistic evidence. Psychiatrists have traditionally felt themselves to be at an income disadvantage compared to other specialties (indeed, in our sample the net private practice incomes of opted-in psychiatrists were slightly lower than, and not significantly different from, those of general practitioners). Together with their limited discretion to increase the rate at which they can provide services, this relative disadvantage provides a powerful incentive to opt out. The striking difference between those who do opt-out and those who opt in, notably their smaller patient loads and higher gross professional incomes, seem to be largely attributable to their prices, which in turn are maintained by locally concentrated opted-out groups.

Indeed, the general differences which appear between opted-in and opted-out physicians – smaller patient loads and accordingly fewer tests and referrals, product differentiation as indicated by age-sex specialization, and less time in patient care – are also related, within the opted-out sample, to higher prices. At one level of analysis it would appear that while physicians opt-out for ideological as well as for financial reasons what really makes a difference to their practice behaviour and to the rewards of opting out is the level of their prices. And we have seen that higher prices are related to the existence of local concentrations of opted-out physicians in particular specialties. Nevertheless it has been clear throughout this chapter that all of these factors are closely inter-related, and that more systematic multivariate analysis may be needed for a proper understanding of them. To such a systematic analysis and its theoretical base we now turn.

4

Theoretical structure and model specification

The last chapter identified a number of characteristics of our samples of physicians and a number of important differences between samples and relationships among variables. That discussion must, however, be taken as simply suggestive; there are many instances in which intervening variables confound the impressions obtained by comparing pairs of variables. Furthermore, the cross-tabulation produced many cells, each with a relatively small number of observations, making it difficult to draw statistically sound conclusions from an examination of differences between cells. Finally, the specification of the cells in terms of the variables was somewhat arbitrary; we simply selected from the total set of variables on which we had data those which were of particular interest, intuitively, or relevant to our more general discussion of the political, economic, and historical context of opting out in Ontario.

To obtain more definitive results we need to undertake a multivariate statistical analysis of the entire practice behaviour of all the physicians in our sample on which we have complete data. This endeavour will occupy the present chapter and the next.

Multivariate analysis does not begin with an examination of the interrelationships between variables. It begins by defining a theoretical structure and articulating a model within which the empirical inquiry is to proceed. Furthermore, we must consider alternative statistical techniques that may help in applying the model to physician practice behaviour. It is tempting to 'allow the data to speak for themselves' by conducting factor analysis or stepwise regression; one can then simply toss all the variables into the hopper of the computer and see what comes out on the printer. This procedure is especially attractive when one is working in a field where the conventional theoretical wisdom is almost entirely undeveloped, and one cannot

draw on well-articulated and tested models. In such a context the 'fishing exercise' involved in such techniques as factor analysis and stepwise regression, the search for patterns in the data, may in fact be the most satisfactory way of identifying interesting hypotheses. But it is no more than that. To test hypotheses derived in this way one needs another independent set of data. Deriving hypotheses and testing them on the same set of data is something akin to fraud.

Unfortunately we do not have the luxury of a second set of data. Nor is our data set sufficiently large that it can be partitioned to create a 'test' sample (though even if it could the question of independence would remain vexing). We have chosen, therefore, to define a theoretical structure for our empirical work and articulate a priori a model embodying the hypotheses we wish to test with the data.

During the past few years health economists have vigorously debated the theory of physician practice behaviour. Two schools of thought have emerged: one accepts the neoclassical economic assumption that supply and demand are determined exogenously, that is, independently of one another; the other school assumes that the demand for physicians' services is influenced directly by the physicians themselves. In the former the demand schedule relating the willingness of consumers to purchase services to prices charged by suppliers is assumed to be determined exogenously, by the consumers' incomes, tastes, health status, and so on. In the latter, demand is thought to be endogenous in the determination of supply.

The debate originated in the work of Arrow (1963) and Feldstein (1970, 1974), where the information problem in the health care market was elaborated. It was postulated that the non-market response to the different information available to suppliers and consumers took the form of an agency relationship between physicians and their patients, whereby the latter transferred consumption decision-making power to the former, at least to some degree.

Both schools of thought acknowledge the existence of the information problem and the agency relationship. The question is not whether the delegation of decision-making occurs, but how universal it is, what constraints operate on physicians in their exercise of their discretionary power, how uninformed and vulnerable patients are, and how complete the agency function is, that is, how effective the ethical, legal, and social conventions are in inducing physician-agents to take *only* their patients' interests into account in making medical consumption decisions. The first school argues either that the extent of the agency relationship is not wide or that its imperfections are not serious; in either case, the endogeneity of demand arising from the

imperfect functioning of the agency relationship [where the physician considers his own (supply) interests as well as the patients' in making consumption decisions] is thought to be a minor wrinkle in a sector still dominated by conventional market forces. Their antagonists argue that the agency relationship is inherently imperfect, particularly in a fee-for-service system, and that this imperfection affects profoundly the operation of the entire health care system. In particular, the second school argues that the demand for health care cannot be specified independently of supply considerations.

For a review of the considerable amount of theoretical and empirical work done in the context of this debate, the interested reader is referred to Greenberg (1978, the chapter by Reinhardt). The Canadian evidence on this issue is discussed in Evans and Wolfson (1978). For the purposes of this study it is enough that we identify ourselves with the 'endogenous demand' school of thought. We have assumed that the physician has considerable ability to determine the demand for, as well as the supply of, his own services. Our focus, then is on the physician's determination of the utilization of his services, a joint supply-demand decision.

Closely related to the debate regarding endogenous demand is the question of the relevant range of a physician's own preferences and attitudes towards his practice behaviour. The neoclassicial economic model treats physicians essentially as profit or 'income-leisure' utility maximizers. Reinhardt (1972) on the other hand, has suggested that profit-maximizing behaviour may be constrained by its 'psychic costs' to physicians, or that physicians may not in fact be maximizers at all. Feldstein (1970) has suggested that physicians value persistent excess demand. Evans (1976) has argued the relevance of physicians' preferences for certain elements of practice 'style.' Few, if any, of the economic models, however, have incorporated medical attitudes toward their patients or their peers, nor have they taken account of attitudes towards the political dimensions of medical practice, that is, attitudes towards the power of physicians, both individually and collectively, within the health care sector.

Physicians' attitudes to both sociological and political dimensions of their practice have been the subject of much study (Blishen, 1969; Colombotos, 1968, 1969, 1975; Friedson, 1971, 1974; Mechanic, 1974a, 1974b, 1974c, 1975; Tuohy, 1974). These studies, however, have focused on attitudes as dependent variables, and with the exception of Mechanic's, they have not attempted to relate these attitudes to the dimensions of practice behaviour with which economists have typically been concerned – volume and mix of services, hours of work, income, practice resources, and so on. We shall now outline our theory of physician practice behaviour and derive a specified

model to be put to empirical test. Finally we shall discuss the estimation procedures adopted, the results of which are reported in the following chapter.

Our model is very complex and tortuous; to some it may seem unnecessarily so. But physician practice behaviour is very complex, and in the absence of sound simplifying assumptions drawn from a well-developed theoretical literature we have chosen to err on the side of completeness rather than to attempt to squeeze reality into an elegant model.

From the point of view of economics physicians can be seen as rational decision-makers with well-specified objectives and a number of instruments at their disposal with which to achieve them. We do not concentrate on financial motivations, nor do we emphasize the role of markets in determining physician practice behaviour. Basically economics is concerned with the use of scarce resources to achieve desired objectives, and though some resources and objectives involve money these are by no means exclusively or perhaps even predominantly the determinants of physician practice behaviour. We model physicians as rational utility-maximizers, arranging their practices, to the extent that they have discretionary power to do so, in such a way as to promote their own sense of well-being. This does not imply that physicians are entirely self-centred; in fact several of the 'arguments' in the utility function we specify involve the relation of the physician to his peers, his patients, and government. Nevertheless, it is his own personal objectives that we are interested in specifying.

THE PHYSICIAN'S UTILITY FUNCTION

We postulate that the utility a physican derives from his practice depends on the net practice income he derives, the amount of leisure time he enjoys, the quality of care he delivers, the extent to which he conforms to peer group standards, his independence from external control by either governmental or professional agencies, and the existence of excess demand for his services. Undoubtedly other factors influence the sense of satisfaction any particular physician derives from the conduct of his practice, but we believe that these six factors capture most of the important ingredients.

Let us look more closely at these variables. Net practice income we define as gross practice income (all collected payments for professional services) less practice expenses. Strictly speaking, allowance should be made for the purchasing power of money and the tax rate facing the physician, so that the important variable for him would be real disposable income derived from practice. However, the cross-sectional nature of our study eliminates the

need to take variations in prices over time into account; and data regarding differences in prices across geographical regions are not available. Furthermore, the dependence of the tax rate on factors other than net practice income (i.e. non-professional income and allowable deductions) makes the transformation to disposable income impractical. Finally, it may be that physicians derive some satisfaction from the level of net practice income itself, in terms of both self-esteem and social status, independent of its final purchasing power.

Despite the fact that many physicians seem to enjoy their work more than any pastime, we postulate that most place an intrinsic value on leisure, defined as the total amount of time available for work or other pursuits minus the hours of work. We include in working time not only time spent in direct patient care but also the associated practice activities of travel, administration, teaching and research, continuing education, and so forth. Leisure we define as non-professional waking-time activities, and we assume that, in the relevant range, physicians would prefer more of these rather than less, other things being equal.

The quality-of-care variable is especially difficult to articulate. The material written on this subject now occupies many feet of shelf space, and we shall make no attempt to add to the confusion surrounding the topic. We believe that physicians are concerned about the quality of care they provide as they see it. This subjective assessment, of course, is affected by the extent to which their practice conforms to professionally sanctioned standards. In addition, the extent to which patients are satisfied with the care they receive undoubtedly affects a physician's own assessment of his quality. Nevertheless, it is the sum total, self-perceived quality of care, rather than some more mechanistic concept, that we postulate as an important factor in determining a physician's satisfaction with his practice activity.

The ideology of medicine involves a curious juxtaposition of individual values and group solidarity. It is the latter to which we refer in our 'conformity' variable. We postulate that, by virtue of a common background, education, and professional socialization process, physicians generally desire to conform to behavioural norms established by a peer reference group. The definition of this group may vary from physician to physician; for some it may be his fellow specialists in the hospital with which he is affiliated; for others the entire physician population in the province may form the 'peer' group, and there are obviously many subdivisions in between. In general, however, we believe that one of the factors that determines whether or not a physician is satisfied with his practice is the extent to which various aspects of his practice behaviour conform to those exhibited by his self-defined peer

group. In this context, non-conformity is seen to detract from the personal utility a physician derives from his practice.

In contradistinction to this group solidarity, the individualistic strain in medical ideology forms the basis for the fifth argument in the physician's utility function, namely his independence from professional and governmental scrutiny and control. Many physicians select medicine as a profession at least in part because of the autonomy of practice it affords. In an increasingly organized, and in many instances bureaucratized, work environment, professional private practice, and medicine in particular, represents a haven for those with individualistic inclinations. This practice autonomy, however, is being increasingly threatened by incursions from peer review boards and government monitoring agencies. The individual private practitioner sees the independence and autonomy of his practice being eroded. This appears to be a matter of some importance to many physicians, and is articulated as such in the official statements of their associations; we therefore introduce it explicitly in the physician's utility function.

Finally, we wish to argue that a variable representing the existence of excess demand for a physician's services should be included in his utility function. This is somewhat unusual, particularly from the perspective of economists, who seem to be allergic to markets which do not clear. Nevertheless, it is plausible that physicians would derive satisfaction from the existence of a queue, both in time and space, within limits. A queue, or excess demand in general, is attractive to physicians for a number of reasons. First, it serves as a self-insurance policy; should a physician be confronted with a sudden need for more income, a queue of patients on which to draw facilitates the generation of additional billings. Second, patients in the waiting room or waiting for appointments facilitate scheduling; the physician can be assured that he will not be kept waiting and his working time will be spent productively. In effect the existence of excess demand ensures that there will not be periods of 'excess supply!' Third, having more demand for one's services than one is willing to supply is in itself gratifying to one's ego. Physicians, like all of us (maybe more so), want to feel needed, and the existence of a queue is tangible demonstration of that need. Finally, as Feldstein (1970) suggests, the existence of excess demand allows the physician to satisfy his desire for an interesting mix of cases by drawing selectively from the queue. For all these reasons (and perhaps others) we suggest that physicians gain positive utility from the existence of excess demand for their services.

In summary, then, we postulate that physicians have a utility function with respect to practice behaviour which is of the form $U = U(Y, L, Q, C, I, X)$, where U is utility, Y is net practice income, L is hours of leisure, Q is self-appraised quality of care, C is conformity with peer group norm, I is

independence from professional and governmental interference, and X is the existence of excess demand for services. We do not venture to put weights on the different arguments in the utility function nor to specify the form of the function in any precise manner. Furthermore, while some of the variables can be quantified directly (Y, L, X), others, such as quality of care and independence, are much more difficult to operationalize. In the present study these problems need not trouble us unduly, for the role of the utility function is not to generate empirically testable hypotheses but simply to provide an organizing framework for the theoretical structure articulated below.

Before commencing discussion of this structure in earnest, it is appropriate to say a word about the instruments a physician has and uses to affect different aspects of his practice activity in such a way as to promote the utility he derives from it. He can determine his hours of work, the other labour resources he uses in his practice, the 'capital' resources he uses (space, equipment, overhead), the extent to which he utilizes outside services which complement or substitute for his own (such as diagnostic tests, consultations, hospital services), the size of his patient load, the demand for his services exercised by these patients, and the quality of care he provides. Over some of these variables (for example, labour resources used in the practice), the physician (or group) has total discretion; over others his discretion, though substantial, may be limited by the behaviour of other actors in the health care system: patients, hospitals, and other physicians, for example. Thus, the availability of hospital resources for any physician is conditional on the privileges he enjoys, and the extent to which he can substitute the services of other providers for his own depends on their willingness to accept such referrals. A more central feature of our theoretical structure, however, is the assumption that physicians exercise substantial control over the number of patients seen in any time period and the number of services provided to these patients. Clearly, the physician does not have unlimited discretion with respect to the level of demand for his services. A considerable role remains for the patient, both in the initiation of treatment and in compliance with followup recommendations. Furthermore, other physicians remain a semi-exogenous source of demand through the referral process. In fact, for some specialists such as anaesthetists, pathologists, and radiologists, referral represents the sole source of demand for services. Nevertheless, we wish to argue that the strategic decision-making role enjoyed by the physician gives him substantial, though not complete, control over the level of demand for his own services.

The actual mechanisms that a physician may use in determining the level of demand are many and varied. The number of patients seen in any period

can be increased by recalling patients more frequently for followup treatment, by increasing 'availability' through rescheduling of office hours, or by 'promotional' activities in community service or hospital committee work. It can be reduced by eliminating some recalls, lengthening the recall period, or, in the limit, closing one's practice to newcomers. The number and type of services provided to patients who do present themselves for care either spontaneously or after recall is of course highly dependent on physician 'management.' Both the intensity of servicing (number of services per visit and number of visits per patient) and the complexity of the service mix are subject to the physician's discretion. A variety of practice styles are observed in treating basically similar patients; the exercise of clinical judgment is, undoubtedly, an essential feature; it is also one which provides considerable scope to the physician in determining the level and mix of services he provides to his patients.

This discussion of the utility-maximizing behaviour of physicians is intended only as a backdrop for the rest of our theoretical discussion. It is no more than that. The utility function is not specified in a way that would allow one to derive testable hypotheses from it; to do so would be entirely arbitrary. Furthermore, some of the relevant variables are not quantifiable with existing data sources. Instead of placing ad hoc restrictions on the form of the utility function and eliminating non-quantifiable variables from the analysis, we have chosen instead to develop a behavioural model of physicians' practice activity which is informed by and consistent with a utility-maximizing framework but is not derivative from it. Until we know more about which simplifying assumptions to make and which restrictions are valid, we can go little further than that. What we can do is articulate a behavioural model of a physician's practice in which the important variables are specified and the causal links between them spelled out. It must be understood, however, that the inability to specify formally the utility maximization process leaves us with no equilibrium condition to impose on the behavioural model. The relationships between variables can be described, and this provides a mechanism for tracing through the effects of any exogenous changes on a physician's practice behaviour, but the final 'resting place' at a utility maximum remains undefined.

Furthermore, because of the nature of the utility-maximizing process any variable can influence any other. We suggest below, for example, that patient load, among other things, determines service workload, which in turn, among other things, determines hours of work. But if the resulting hours of work turn out to be excessive, patient load could be reduced accordingly. In this manner there is a potential feedback effect from hours of work to patient load in pursuit of a utility maximum. Our inability to specify the equilibrium conditions for a utility maximum means that we cannot fully trace out these

feedback loops. We shall therefore concentrate on describing the flow of the behavioural relationship, recognizing that in cases of utility disequilibria reverse causal linkages may be observed.

THE BEHAVIOURAL SCHEMA

The behavioural model will be discussed in two stages: first, we present it in schematic form, defining the variables and the causal links as fully as possible, even to the extent of including variables that cannot be quantified with our existing data resources. Then, from this schema we derive the specifications of an empirically testable model. The theoretical treatment will end with a discussion of some of the econometric problems in estimating the model.

To show fully the complexity of the behavioural model with which we are dealing, it would be useful to present it in its full glory with all the variables and causal links displayed *en masse*. Unfortunately, such a presentation requires either a three-dimensional space or multicoloured printing processes (or both!). The most practical solution, though somewhat cumbersome, is to depict each of the central variables in turn with its linkages to the other variables in the system. One can then view the entire schematic system as a conjunction of all these components.

The variables identified here as being relevant to a description of a physician's practice behaviour are as follows: patient load, workload (in terms of services provided), queue, hours of work, labour resources and practice overhead, quality of care, use of services complementary to the physician's own such as diagnostic tests, referrals, patient pool, intensity of servicing, the complexity of the service mix provided, characteristics of the physician including his financial need, characteristics of the patients, peer group practice norms, hospital facilities available to the physician and his patients, the number of physicians per capita in the community by type of physician, the gross and net professional income of the physician, and the average price charged (for opted-out physicians). Some of these variables are straightforward and directly quantifiable; others are more difficult to handle. The reader will already be familiar with our measures of a number of these variables from the discussion in chapter 3, and they will be referred to again when we discuss the equations. Nonetheless, it is worth outlining now the variables in our model.

The patient load is simply the number of discrete patients seen by the physician. The workload is measured in terms of the dollar value of the insured services provided using the OHIP schedule of benefits as the dollar weights in aggregating service counts. Clearly different types of services cannot simply be added together to get a workload measure; some kind of aggre-

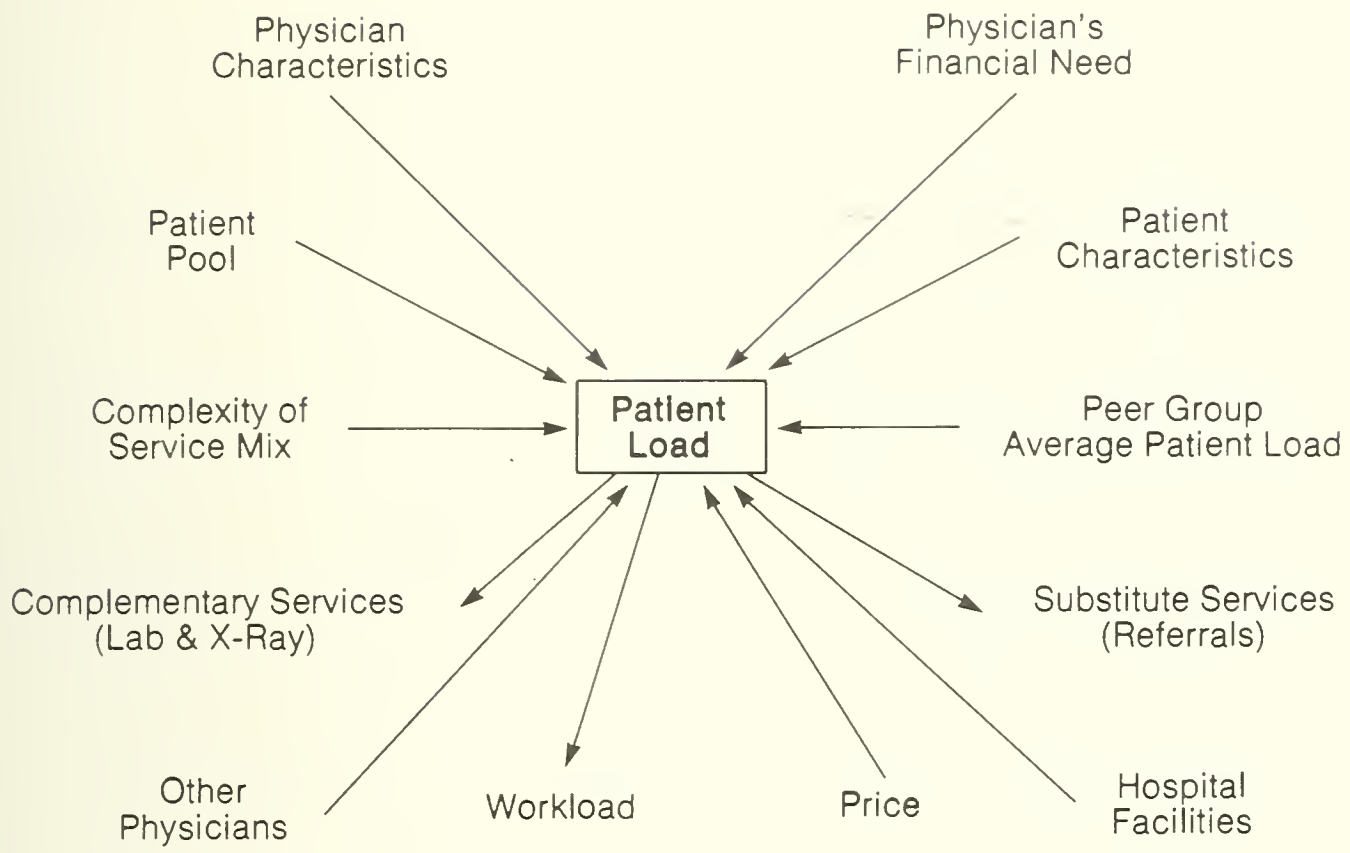
gating weights are needed, and for convenience we have chosen to use the fee schedule as a weighting source. The queue variable relates to measures of excess demand for a physician's services, in terms either of average waiting times for appointments or the average number of people in the waiting room. Hours of work is straightforward, as are the non-physician labour resources employed, the practice overhead (i.e. non-labour expenses), and gross professional income. Quality of care must be included in any behavioural description of a medical practice. The only measure we could obtain was the non-referred use of other physicians' services by a physician's patients, and this measure is applicable only for general practitioners. The hypothesis here is that a high level of patient self-referral is one indicator of poor quality care.[1] The measurement of complementary services is restricted to tests ordered; data on use of hospital facilities in general are not available by individual physician. The rate of referral is measured directly. The 'patient pool' is not an observed entity; it is the group of past and present patients from which a physician draws his current patient load. Patients can be 'drawn' from the pool by recall for periodic examinations or followup visits on a long-term basis.

The intensity of servicing, another important though unobserved variable, is potentially measurable by the number of services per visit and visits per episode, but data on these are not available. The complexity of the service mix shows the extent to which the physician provides specialized services. Physician characteristics are personal attributes which determine the weights in the utility function as well as the technical facility to practice. Furthermore, we include in this category indicators of financial need such as a large number of dependants and an unemployed spouse. Patient characteristics are basically aspects of the patient load, age-sex distribution, health status, income, and education that would affect utilization.[2] Peer group norms are

1 It is, however, only a poor indicator. The construction of our patient load variable is such that all patients treated at least once by a physician in the five-month period September 1975 to January 1976 are included in his patient load. Those patients who are dissatisfied with the care they receive from physician A may seek out the services of physician B or C, etc. If this occurs during the five-month period, the patient will appear as part of the practice load of each physician with whom he has contact. The behaviour of this patient will thus add to the 'self-referral' rates of both the physician losing the patient and the one gaining him. On balance, however, it is conjectured that poor-quality physicians losing patients will have higher over-all use of other physicians by their patients than high-quality physicians, whose patients are more likely to be stable and loyal.

2 Only some of these characteristics are quantifiable with existing Ontario data: health status, notably, is not. Conceptually, of course, even under our assumption of substantial physician discretion, the health status of patients is a key 'patient characteristic' affecting practice behaviour.

Figure 1
Patient load

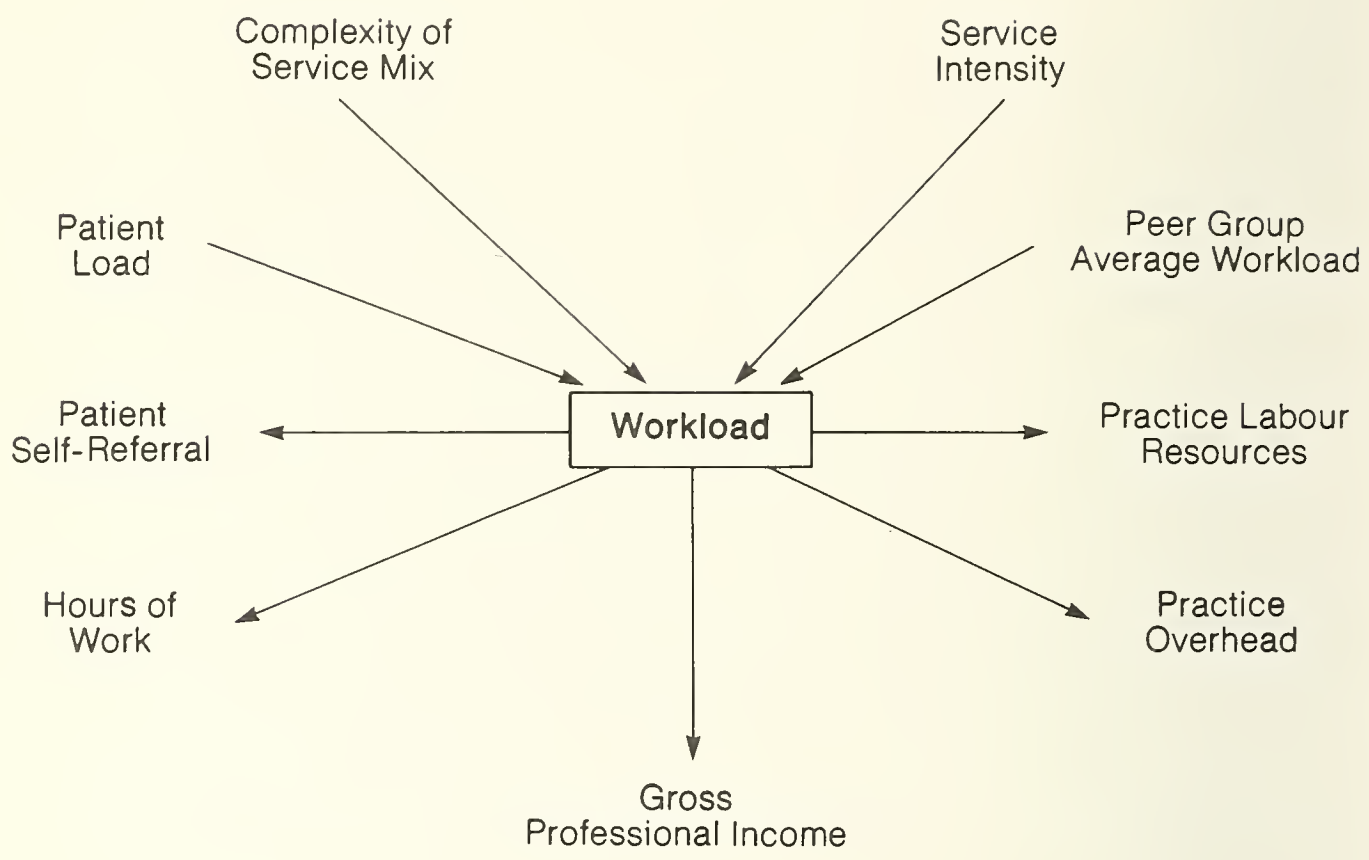


established in each aspect of practice by the average behaviour of a physician's peers defined as members of the same specialty in the same county. The hospital facilities available are defined in terms of active treatment beds per capita; the number of physicians per capita is straightforward, as are the income variables. The average price charged is defined in relation to the OHIP benefit.

We postulate that all these variables are linked by causal relationships in ways we shall now specify with the aid of diagrams. Figure 1 depicts the linkages for the patient load variable. In our behavioural schema patient load is determined by the size of the patient pool and various factors that influence the rate at which patients are drawn from the pool: physician characteristics and his financial need, patient characteristics, average peer group patient load to which he will try to conform, the availability of hospital facilities with which to manage patients, the availability of other physicians' services for patients in the pool, the extent to which the physician provides unusual services, and, in the case of opted-out physicians, the average price charged over and above the OHIP rate. The size of the patient load in turn affects the use of diagnostic tests and referrals and the service workload of the physician. Basically, the only options available to a physician in dealing with a patient are testing, referral, or service.[3]

3 One of the implicit service options, of course, is no service at all.

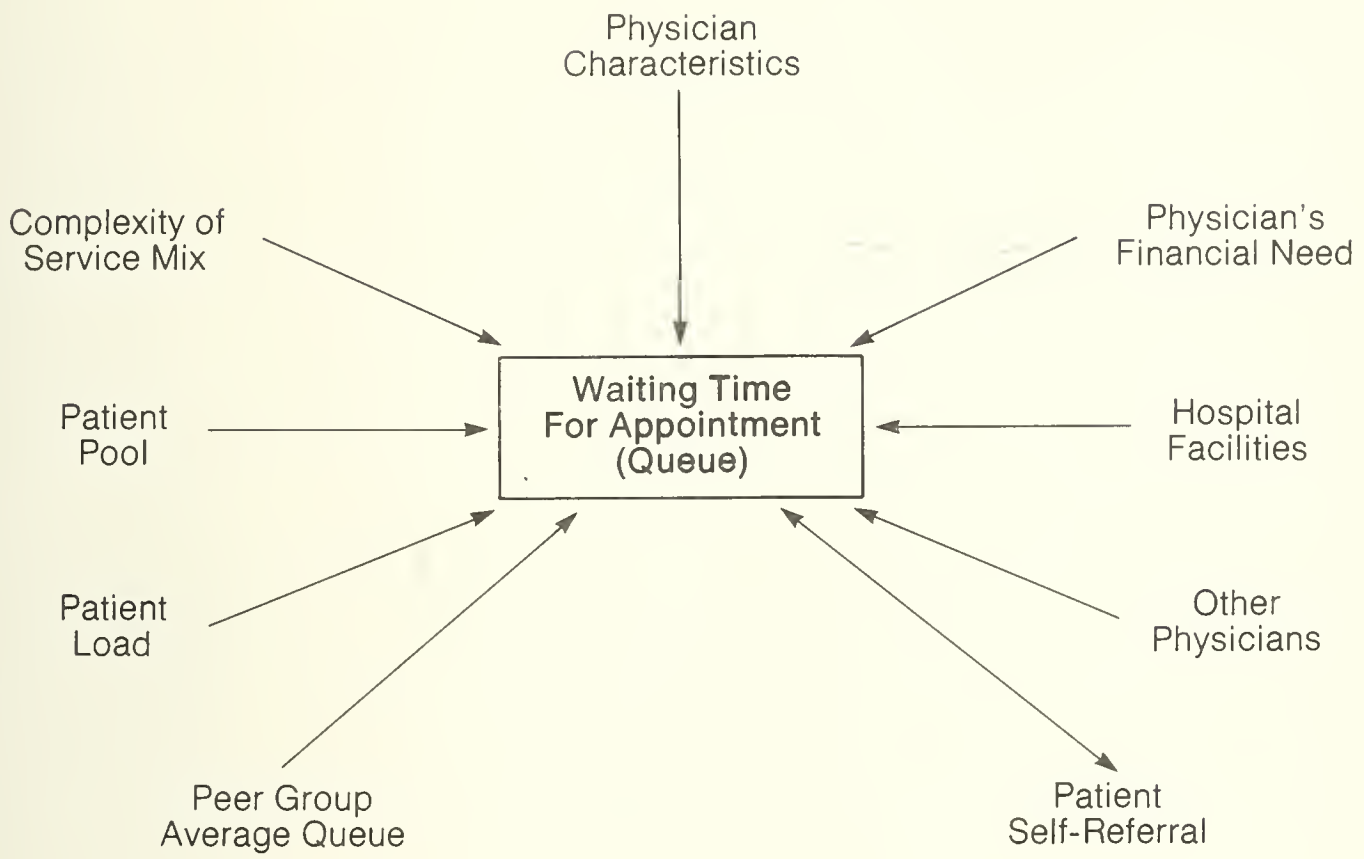
Figure 2
Workload



The service workload variable relationships are outlined in Figure 2. As indicated in Figure l, patient load is a determinant of workload. So also are the intensity of servicing and the complexity of the service mix provided, since workload is defined in dollar volume terms. Again we postulate that an emulation effect is at work, with average peer group workload establishing a norm. Workload itself influences a number of other variables. It determines resource requirements for the practice, which can be met by various combinations of physician time, non-physician labour inputs, and non-labour practice resources (examining rooms, equipment, and so on). To the extent that the resources mustered are inadequate the workload will influence the amount of patient self-referral – excessive workload demands will presumably affect the quality of care in a negative way. Finally, since workload is a dollar volume measure, it establishes the base for gross professional income, the other component of which is the average price charged.

The waiting time for appointment is determined by a number of factors (Figure 3). How keen the physician is on having a queue undoubtedly depends on his personal characteristics; his financial need is also of consequence, since a queue serves as a kind of insurance policy. The availability of hospital facilities, particularly emergency and outpatient departments, as well as the availability of other physicians will shorten the queue for any particular

Figure 3
Waiting time for appointment



physician. The patient pool is the basic source for the queue, as it is for the patient load. Given any patient pool, then, as more are drawn into the active practice load fewer are available for the queue. In other words, three things can happen to patients in the pool: they can be left there, drawn directly into the active practice load and treated, or placed in the queue. The extent to which a physician is able to hold patients in a queue depends not only on his personal appeal but also on the complexity of the service mix he provides; more specialized physicians can, other things being equal, maintain a longer queue than those for whom relatively many substitutes are available. The causal relationship between the queue and the quality of care as measured by patient self-referral is two-directional: high-quality care enables physicians to retain patients in the queue, but a queue of excessive length will lose patients off the end to alternative providers. Finally, we would anticipate an emulation effect for this variable as well.

Figure 4 depicts the place of hours of work in the behavioural schema. Workload, of course, determines the primary requirement for physician time, but the extent to which a physician chooses to substitute other practice resources for his own time depends on his personal characteristics and his financial need. To some extent the possible tradeoffs are limited by the tastes and requirements of the patient population served. If inadequate time is

Figure 4
Hours of work

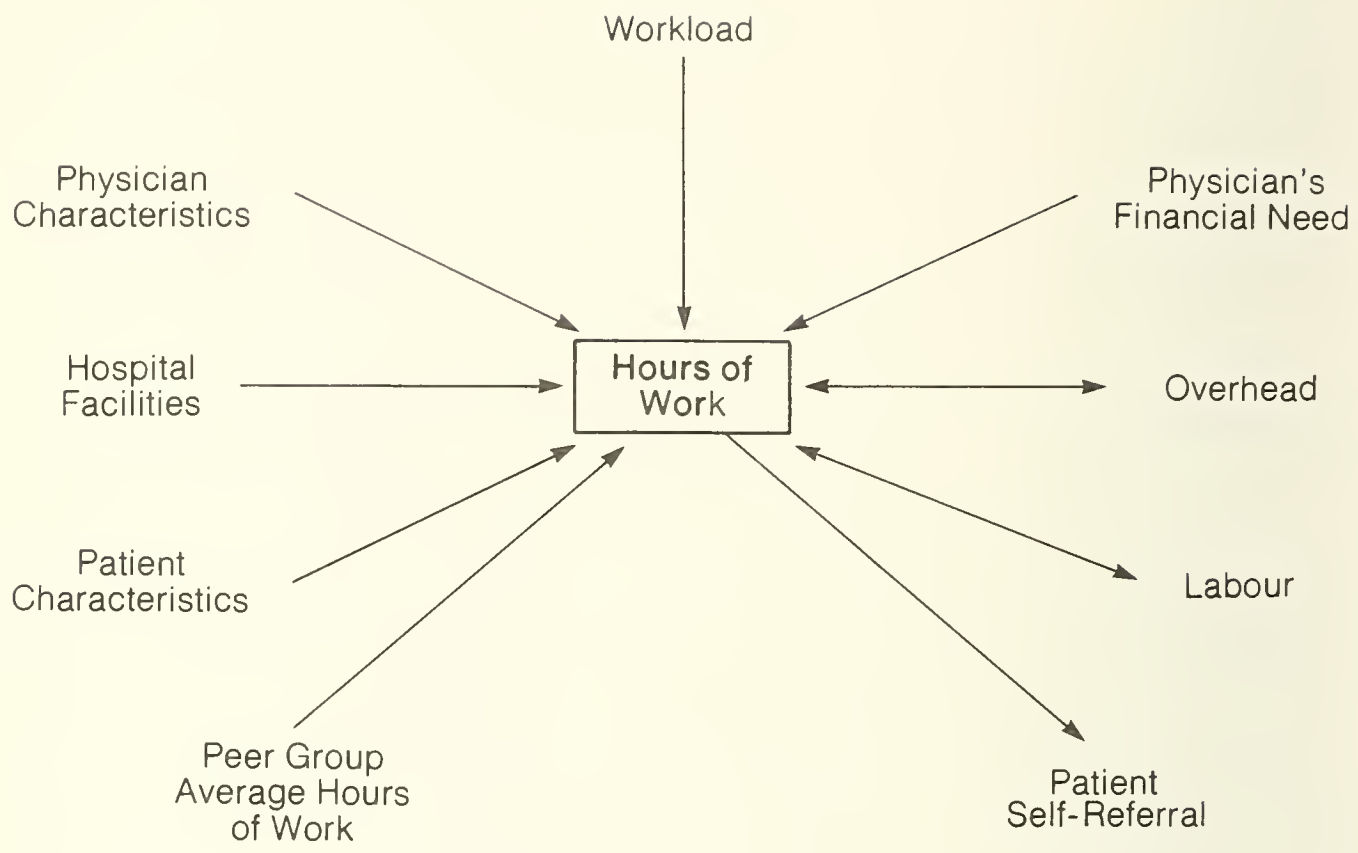


Figure 5
Practice labour resources, overhead

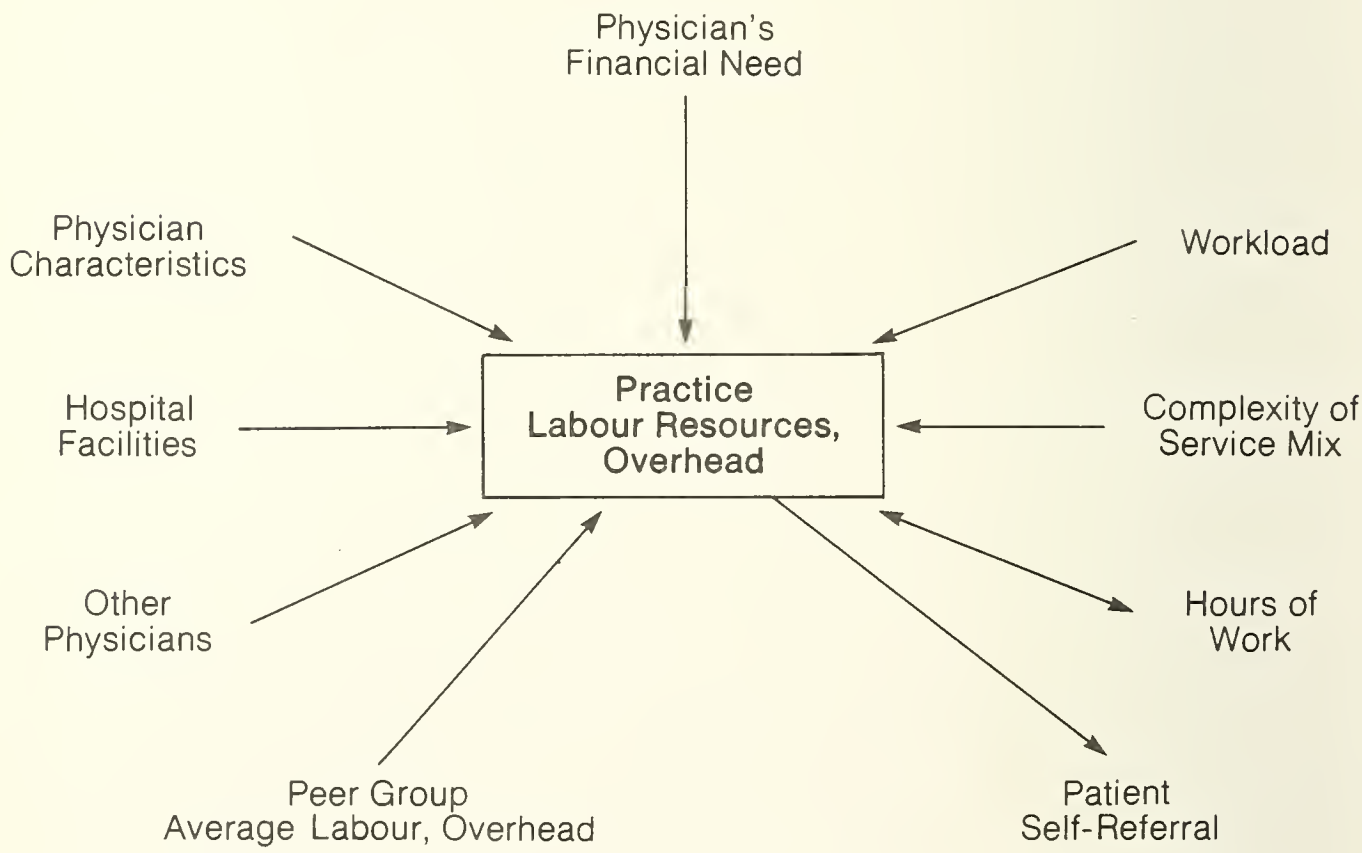
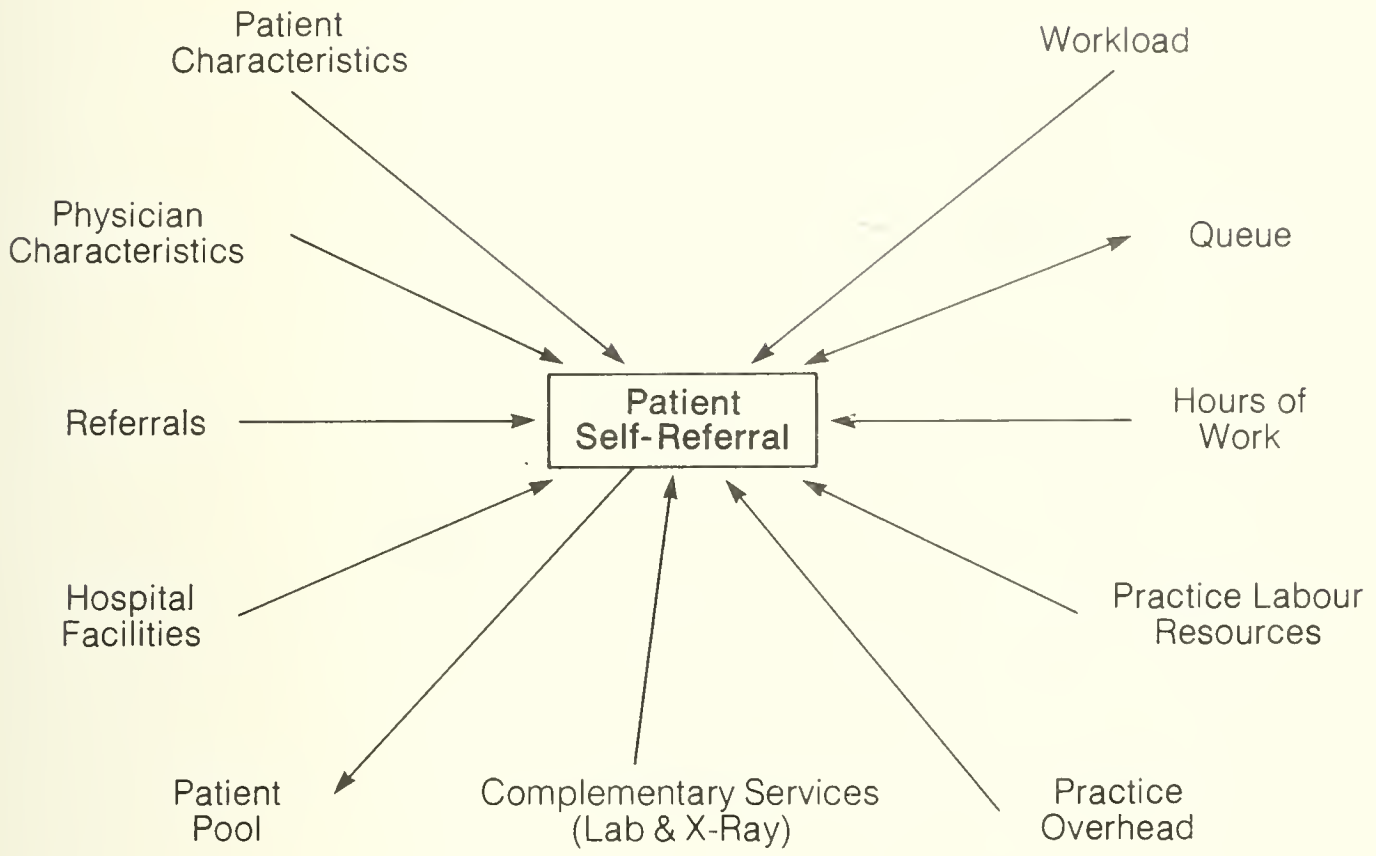


Figure 6
Patient self-referral



spent with patients, self-referral may result. Hospital facilities represent both a complement to the physician and, in some cases, a substitute for his own time.

The causal links depicted in Figure 5 for labour and practice overhead are almost entirely analogous to the ones for hours of work discussed above. The number of other physicians in the area is included to pick up the effects of heightened demand for auxiliaries and space created by these competing practices. The additional factor included here is the complexity of the service mix, which may require the use of specialized equipment and non-physician personnel.

Figure 6 describes the array of factors related to our quality of care variable, patient self-referral. Clearly patient characteristics are of importance here, as well as those of the physician. The relationships between self-referral and workload, queue, hours of work, and practice resources have been discussed above. The use of hospital facilities for admission or the use of diagnostic tests will reduce patient self-referral to another physician, as will pre-emptive action by the physician in direct referral to a consultant. Finally, it should be noted that a patient who self-refers to another physician is likely to be lost from the patient pool.

Figure 7
Complementary services (laboratory and X-ray)

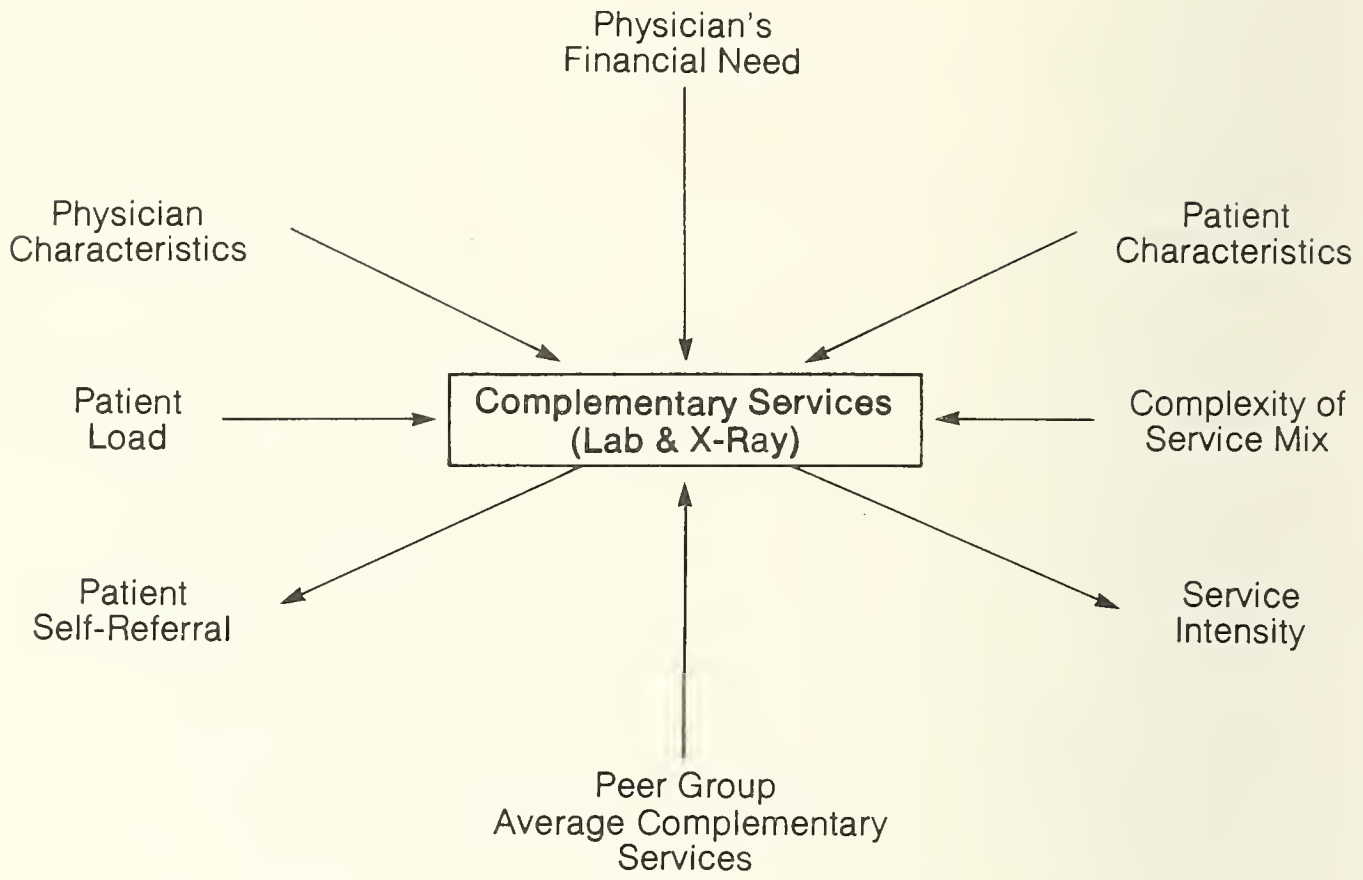


Figure 8
Referrals

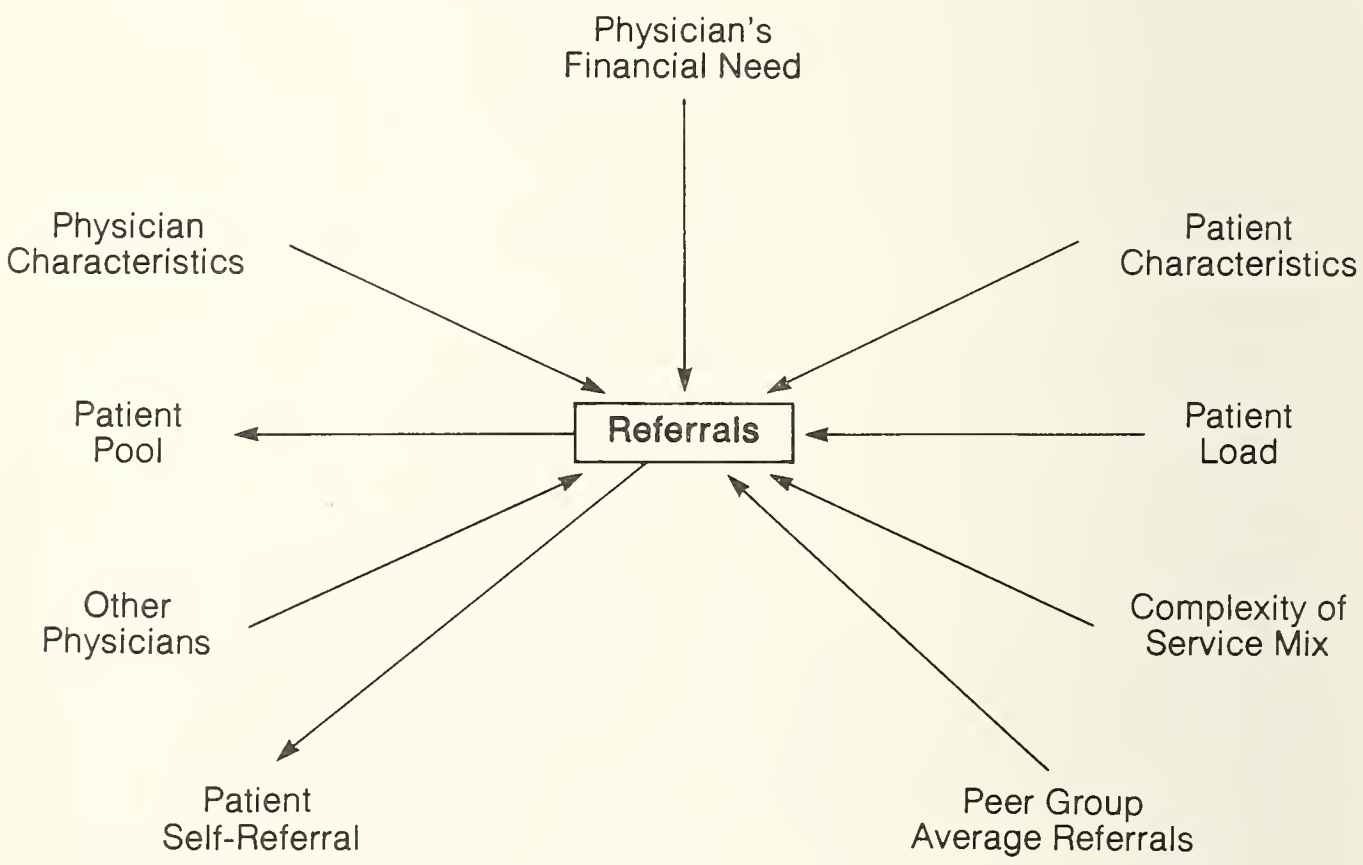


Figure 7 illustrates the role of complementary services in the behavioural schema. To the extent that the ordering of tests enables the physician to intensify his service provision through recall and followup, the use of complementary services will depend on the physician's characteristics and his financial need. There is also likely to be some emulation of peer group behaviour in this respect. Patient-initiated demand for tests is also likely to be influential in some cases, and certainly there is a scale effect: more patients require more testing. As noted above, ordering tests for patients is also likely to reduce self-referral. Finally, it should be noted that the complexity of the service mix provided is likely to be an important determinant of the amount of testing required.

In some sense referrals are the counterpart to diagnostic tests; they are substitutes rather than complements. The financial forces would thus work in the opposite direction here (Figure 8). The requirements of patients for referral on the other hand would be similar to the demand for tests, and again a scale effect is anticipated. Since referral patterns represent an important mechanism for interprovider contact, peer group norms for this aspect of practice activity are likely to be influential. The role of other physicians is complicated. They are the providers of consultant services, and thus their availability should enhance the rate of referral; on the other hand competition from other physicians may make a physician loath to risk the loss of patients through referral. As indicated in Figure 8, we postulate that the patient pool may be diminished by referrals.

Figures 9 and 10 concern to two unobservable variables in our model, the patient pool and service intensity. (There are, unfortunately, other unobservables such as the peer group averages for queue, hours of work, practice resources, and complementary services.) The size of the patient pool is contingent on characteristics of the physician, especially those that make him attractive to patients. In a negative way, patient dissatisfaction, as expressed through self-referral, will diminish the size of the pool, as noted above. The competitive environment should have some influence over the size of the patient pool; more physicians per capita in the area should reduce the number of patients available to each. The hospital represents a source of contacts for the physician with which he can increase the size of his pool through referral from other physicians. On the other hand referrals to other physicians might result in a loss of patients from the pool. Finally, for opted-out physicians one would assume that the price charged might constitute a barrier to some patients and thus lead to a smaller pool. As indicated in the diagram, patient pool is a direct determinant of patient load.

Figure 9
Patient pool

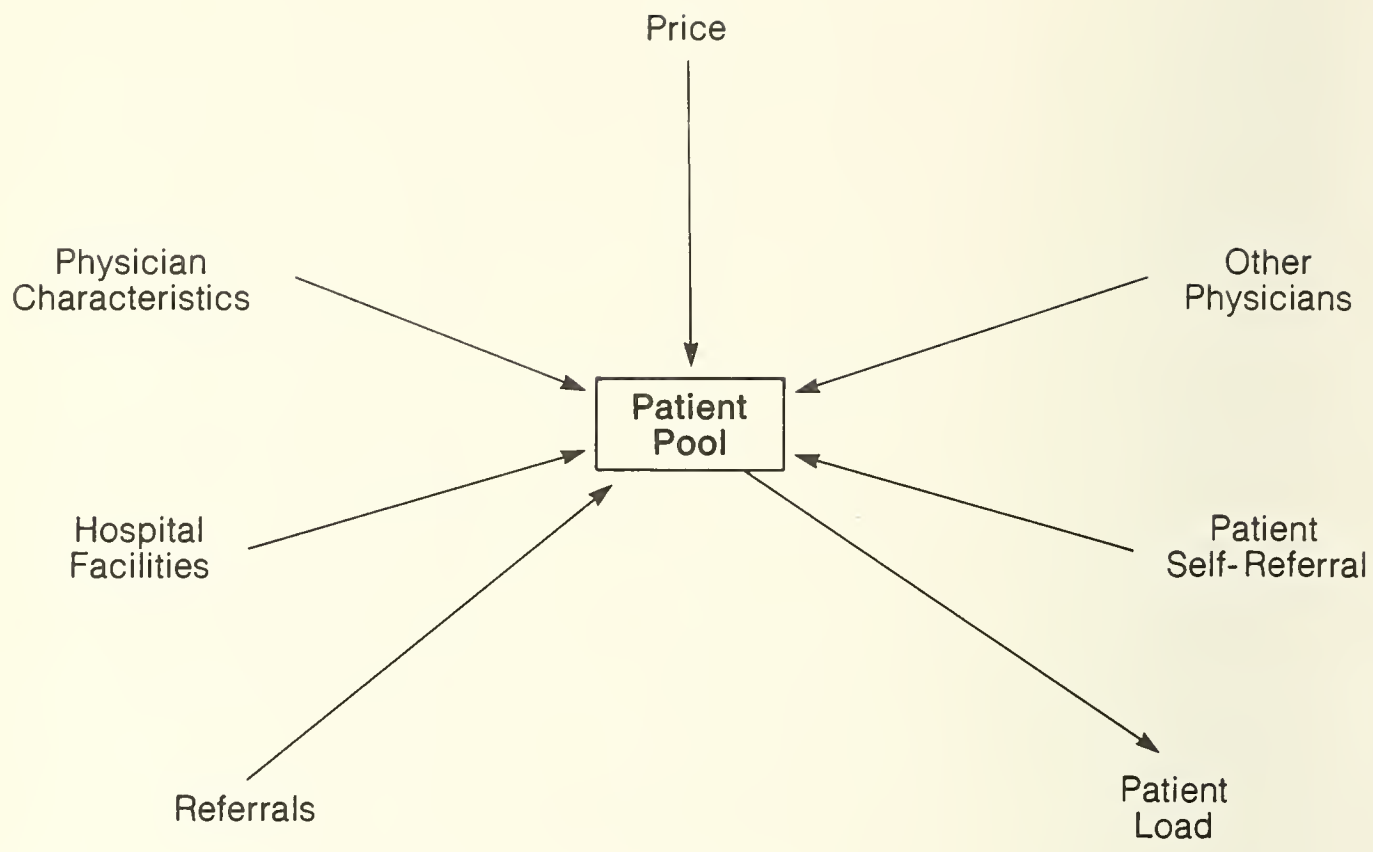


Figure 10
Service intensity

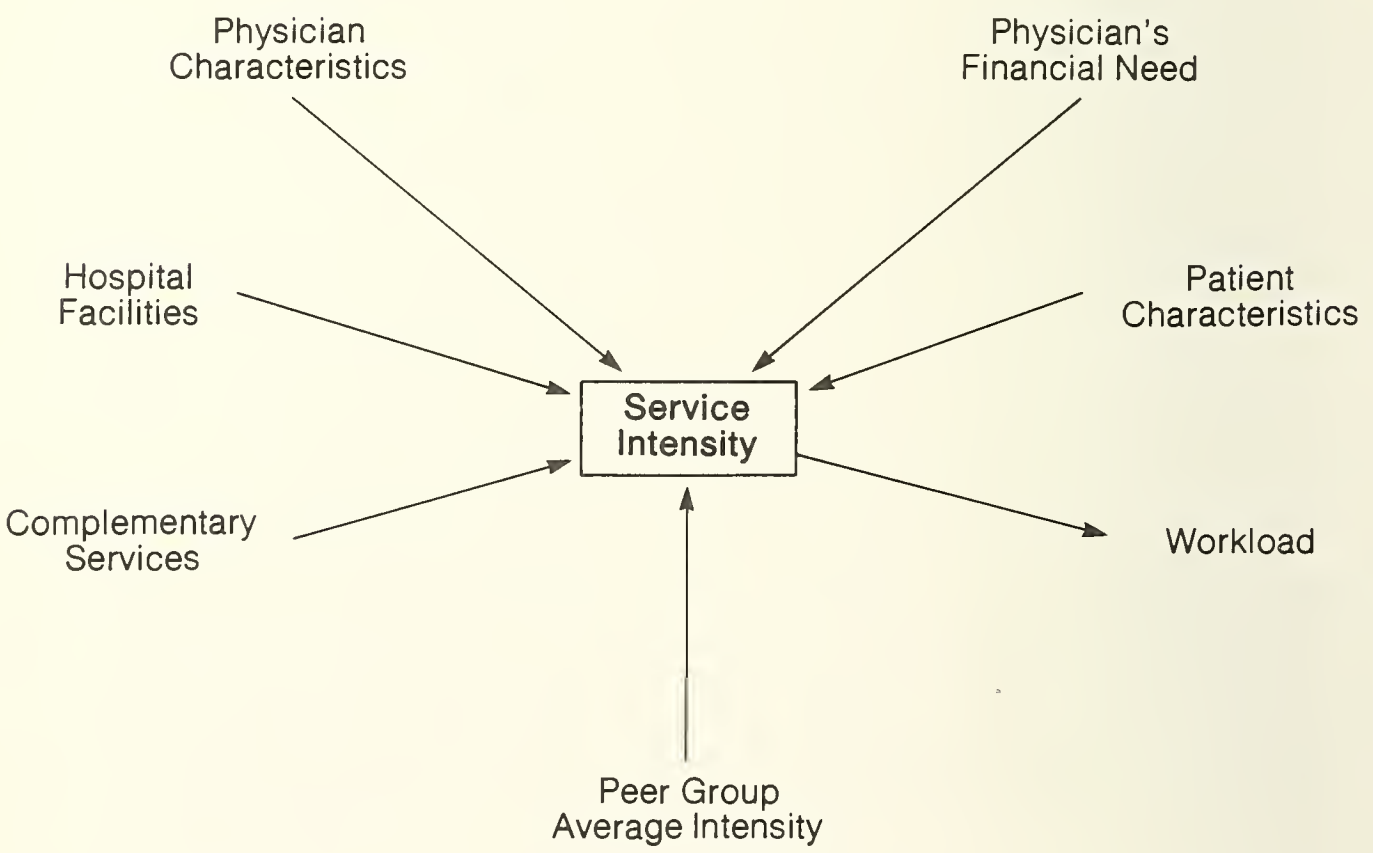
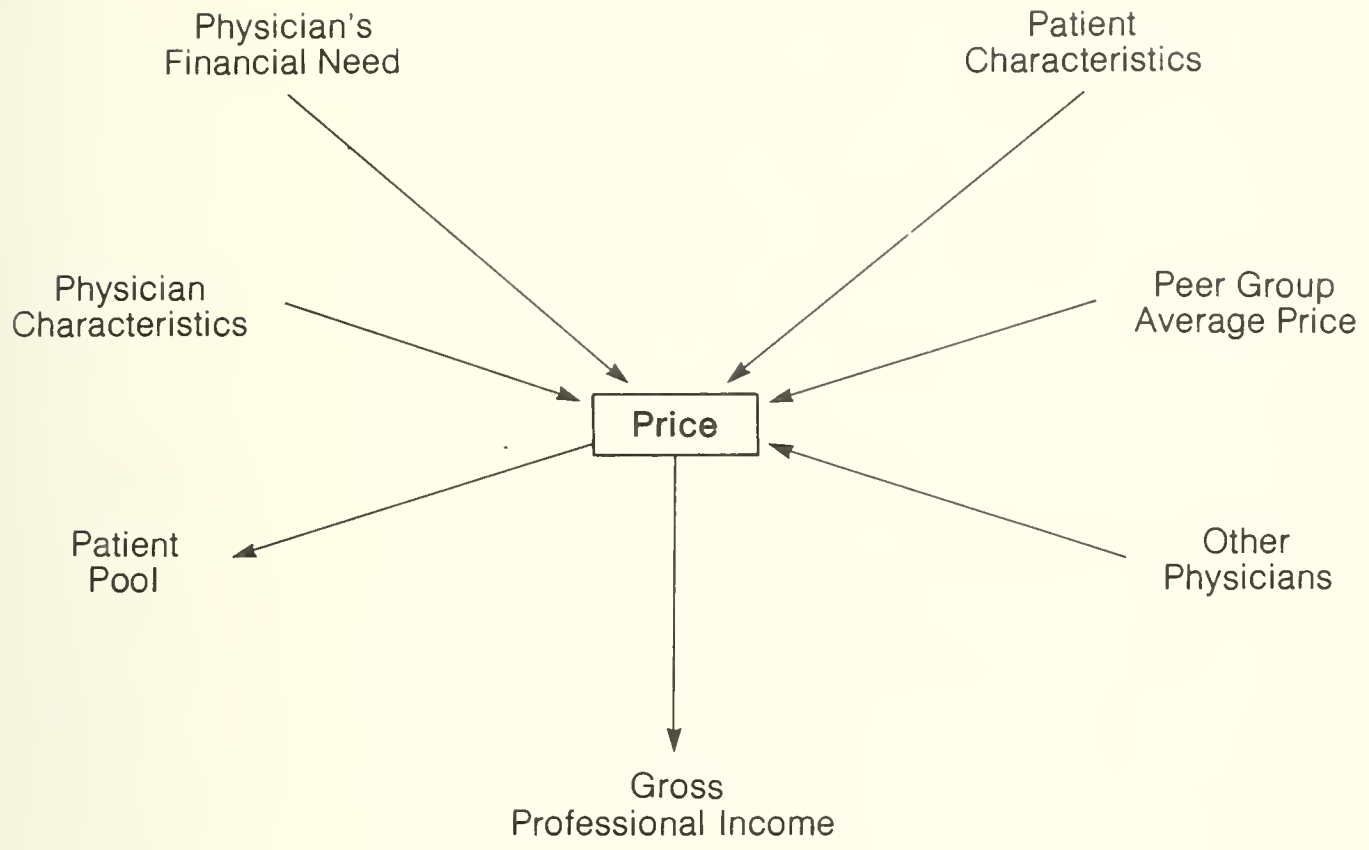


Figure 11
Price



Service intensity is determined by the physician's practice style and is thus related to his personal characteristics and financial need, among other factors. Emulation of peer group practice is likely to be present. Patient characteristics are also of importance; some types of patients simply need more servicing and followup care than others. The availability of hospital facilities and the use of diagnostic tests enhance the ability of the physician to increase his service intensity, which in turn increases his workload.

The last item in our schema, price, is relevant only for opted-out physicians. As depicted in Figure 11, we postulate that the average price charged is influenced by characteristics of the physician and his financial need. Patient characteristics are relevant, as well, particularly income status. It is likely that peer group norms will be important in determining pricing structures, but the competition from other physicians in the area should act as a restraint on prices to some degree. The level of a physician's prices has a negative effect on the size of the patient pool, but it obviously makes a positive contribution to gross professional income.

This completes our review of the behavioural schema. If Figures 1 to 11 were merged into a single display, the array of relevant variables and the causal links would provide a representation of our assumptions about the nature of a physician's practice and the factors which impinge on it in a

significant way. The ideal diagram would be crowded with boxes, and causal arrows would cut across each other at numerous points. The complete situation might seem almost hopelessly complex, but such is the nature of physicians' practice behaviour, we believe. Using the behavioural schema as a base we shall now specify the model used in the econometric analyses.

THE SPECIFICATIONS OF THE MODEL

The model we use in the multivariate analyses is composed of two parts, one describing the option decision and the other describing practice behaviour given the option status. In our view the option decision is logically prior to the determination of practice behaviour in terms of patient load, queue, practice resources used, and so forth, though it can be affected by these factors in a utility-maximizing calculus. We have specified an equation, therefore, that estimates the probability that a physician will decide to opt out of OHIP. Given his actual option decision, we then set up three behavioural 'regimes,' systems of equations describing practice behaviour for each of opted-in general practitioners, opted-in specialists, and all opted-out physicians. The segmentation of the opted-in regime into general practitioners and specialists was done because it seemed likely that these two groups would have very different practice behaviour patterns and therefore deserved separate consideration. Because of data limitations, it was not possible to segment the opted-out sample the same way; moreover, we judged that such a division might be less important here than in the opted-in case, since the option decision might dominate the determination of practice behaviour for opted-out physicians as a whole.

In any event, specialty effects can be taken into account by using dummy variables. We have then one option equation and three sets of equations relating to different aspects of practice behaviour. The three sets are quite similar in specification but have certain notable differences. For each regime we specify equations for patient load, workload, queue, hours of work, labour resources used, practice overhead, diagnostic tests ordered, and referrals; the patient self-referral equation is specified only for opted-in general practitioners (the data are meaningful only for this group), and the price equation is obviously specified only for the opted-out regime. The variables introduced in each equation are also very similar; the only major difference relates to the introduction of dummy variables for each of the specialty groups represented in the opted-in specialists and opted-out regimes. Minor differences will be noted as the specification of each equation is discussed in turn.

We begin with a discussion of the option equation; since it is of central importance to our enquiry and does not draw explicitly on the behavioural schema already outlined, we deal with it in considerable detail. The practice behaviour equation specifications receive more summary treatment, and each equation is discussed with respect to all three regimes at the same time. Where the behavioural schema includes variables such as patient pool or service intensity, the observed determinants of these factors are introduced into the equation in question in lieu of the unobserved variable. Thus, for example, in the patient equation we would hope to introduce patient pool into the specification, but since it is unobserved we introduce instead the determinants of this variable, such as patient self-referral and price. After we have described each equation the whole system is presented in matrix form in Table 23.

THE OPTION EQUATION

Using the model and the descriptive statistics presented in chapter 3 we can specify an equation to estimate the probability that a physician will opt out of OHIP. As noted above, we believe that the option decision turns on ideological as well as financial considerations and is affected by the characteristics of the market in which the physician practices and by his position in that market.

Market and community characteristics

In the first place, we would expect the probability of opting out to be influenced by community characteristics, in particular by urban location and by average family income. Beck's findings, noted in chapter 2, that price elasticity for medical care is greater in lower-income than in higher-income groups bears out the intuitive judgment most physicians could be expected to make. We would, then, expect a positive sign on the average county family income variable AVINC in the option equation. For several reasons we would also expect urban location URBAN to enter positively. Urban consumers may be more responsive to the 'differentiated products' of opted-out physicians. In addition, we have anecdotal evidence that the physician-sponsored insurance plan, Physicians' Services Incorporated, concentrated its efforts on recruiting individual subscribers in rural areas. Before the advent of medicare, then, physicians in rural areas, almost all of whom participated in PSI, were used to receiving 90 per cent guaranteed payment for almost all their patients and could be expected to continue this experience by opting into the government plan. For similar reasons rural patients are more likely to have been unaccus-

tomed to receive bills direct from their physicians under PSI and may have resisted direct billing under OHIP. Finally, physicians in rural areas, who are more likely to be in a monopoly position,[4] may paradoxically be less likely, for this very reason, to opt out. They may feel an obligation, as one of few local physicians, and as part of the same social network as their patients, not to exploit their favourable competitive position by opting out.

In general, however, we would expect that the more competition a physician faces from opted-in physicians the less likely he is to opt out. We would therefore expect the number of physicians per capita in the physician's county OTHERDOC to enter the equation with a negative sign. Conversely, the percentage of physicians in the physician's county and specialty who are opted out CPCTOUT[5] should enter positively.

We would expect the CPCTOUT variable to be a powerful one, not only because of what it tells us about a physician's competitive environment but also because of our understanding of the political and economic organization of the medical profession as set forth in chapter 1. Cohesive locally based groups have existed for years within (and in some tension with) a profession predominantly individualistic in economic organization and political ideology. We would expect the power of these groups to appear strongly as an influence over so basic a practice-organization decision as option status.

The physician's own competitive advantage in his local market is also relevant to the option decision. We have noted that such measures of market power as years in practice in present location YRSLOCAL and part-time teaching appointments PARTTIME are positively correlated with opting-out, and we would expect to find similar positive effects in this equation. In addition, we have included two other 'market power' variables whose effects are likely to be marginal to those just described, graduation from an Ontario medical school GRADSCL and membership on the medical advisory committee of a hospital MAC, as measures of integration into and status within the local medical community respectively.

Financial motivation

We have seen that physicians in specialties in which average OHIP billings are low in relation to other specialties are more likely to opt out of OHIP for financial as opposed to ideological reasons (and to charge higher prices when they do), although the correlation of this relative financial status with the option decision in general was weak. In this equation, which takes ideological

4 Our OTHERDOC variable, since it is on a county base, does not control for this effect.

5 This variable was 'cleaned' by removing the respondent from the numerator and the denominator.

factors into account, we expect the ratio of average billings in the physician's specialty to the grand mean RELPOV to have a negative effect. Our two other measures of financial 'need' relative to other physicians – number of dependants and employment status of spouse – need to be considered together and therefore were not presented in our earlier bivariate analysis. Here assuming that financial 'need' may lead a physician to opt out, we would expect the marginal effects of the number of the dependants DEPENDTS and the dummy variable for employed spouse SPEMP to be positive and negative respectively.

Ideological motivation

In chapter 3, we found opted-out physicians to be less liberal and more conservative CONS than opted-in physicians, and we expect the liberal LIBERAL and conservative dummy variables to have negative and positive signs respectively in the option equation. We have also included a number of ideological variables whose effects did not appear significant in our bivariate analysis, believing that their marginal effects might appear in this equation. Hence we would expect that the weak positive relationship between opting out and disapproval of the power of the Medical Review Committee LESSMRC might appear more strongly when other predisposing factors are taken into account. Similarly, the attitude that the medical profession ought to have more power than government in planning the delivery of health services MEDVSGOV might be expected to have a marginally positive effect on the probability of opting out. Finally, we would expect British immigrant physicians BIRTHENG, who may have left Britain precisely because of dissatisfaction with the National Health Service, to be more likely to transfer this attitude to OHIP and to opt out of the plan.

Specialty effects

We suggested earlier that technical and institutional characteristics of the practice of certain specialties might make practitioners more or less likely to opt out. Those specialists with limited discretion to increase the rate at which they practice – psychiatrists, anaesthetists, and to some extent surgeons – might be more disposed to use a price instrument. Similarly, specialists who offer care on an episodic basis, such as obstetricians, other surgical specialties, and anaesthetists,[6] might be expected to be more likely to opt out, since the deterrent effect of their prices for any given patient may not be as great as

6 It will be remembered, however, that opting-out rates in anaesthesia are particularly difficult to predict a priori (see chapter 3). On one hand their limited discretion and episodic contact with any given patient might lead to high opting-out rates. On the other hand the fact that they are selected in most cases not by patients but by surgeons may constrain their ability to charge prices above the OHIP benefit.

for specialties that offer continuing care. We have therefore included our specialty group dummies in this equation. The silent dummy is general practice (without certification by the College of Family Physicians), which on our hypothesis affords the greatest degree of discretion over non-price instruments (and which has the lowest opting-out rates in the medical population). We would therefore expect positive signs on all the specialty dummies, with some – psychiatry, obstetrics and gynaecology, and surgery – more significant than others. It will be noted that we have included certification in family practice CCFP as a specialty dummy. Certificants, with their greater investment in training, might be expected to feel more acutely than other general practitioners the low ratio of average general practice billings to those of physicians in general. Hence we would expect a marginally positive effect from this variable.

Other characteristics

Two other characteristics might have a marginal influence upon the decision. Full-time teachers FULLTIME may be less likely to opt out, given their large salaries. Tuohy's earlier work (1976a and b) suggests that academic physicians engage in an 'accommodation' with government in which they are less concerned with their entrepreneurial discretion than with the primacy of medical judgment in clinical matters. Part-time teachers PARTTIME, with their nominal stipends, are more likely to opt out and take advantage of the practice-streaming exemption.

Finally, we have speculated that non-British immigrants BIRTHOTH may be more likely to opt in to OHIP in order to integrate themselves into the prevailing system of health care delivery (we have already noted our hypothesis regarding the greater propensity of British immigrants to opt-out).[7]

We now consider the equations describing practice behaviour once the option decision is made. These specifications draw on the behavioural schema outlined above; in each case, however, we need consider only those blocks of variables with causal linkages inwards, the arrows pointing out from the central box being irrelevant for the specification of the equation for that variable.

THE TOTAL PATIENT EQUATION (TOTPAT)

Figure 1 identified physician characteristics as important in determining patient loads. There are a number of different aspects to the influence of this

7 We have not included country of origin in any behavioural equations other than that estimating the option decision. We simply do not have any a priori hypotheses regarding the practice behaviour of immigrant physicians beyond this fundamental choice.

category; presumably different physicians will have different abilities to generate a large patient load and different preferences for having a large practice. The particular characteristics on which we have data, and which we believe might affect patient load, are

– Years of practice YRSPRAC: we expect a positive effect reflecting the normal growth of a practice with a negative sign on the square of this variable YRSPRACSQ indicating a tailing-off effect in later years.
– A dummy variable indicating that the physician has been in his present location for less than two years YRSLCN2: we expect a negative sign on this variable indicating the startup phenomenon.
– Teaching appointments, both part-time PARTTIME and full-time FULLTIME, can be expected to have a negative effect on patient load.
– Specialty designation: some specialties are likely to have larger practices than others, so that certification in a specialty is a characteristic of importance. (In the opted-in general practitioners INGPS and the opted-out physicians ALLOUT regimes, the 'silent dummy' is general practitioners who are not certificants of the College of Family Physicians, and the anticipated signs on the included specialty dummies indicate the expected sizes of patient loads relative to those of non-certified general practitioners. In the INSPECS regime the silent dummy is paediatrics PEDS.) We anticipate that certificants of the College of Family Physicians CCFP will have smaller patient loads than their non-certified counterparts, since it is part of their ethos to provide more comprehensive health care, and presumably this would limit the number of different patients seen. Obstetricians and gynaecologists OBSGYN are thought to have smaller patient loads than general practitioners. The same can be said of psychiatrists PSYCH. On the other hand specialists who do not engage in continuing care can maintain larger practices – this would apply to surgeons SURGERY, anaesthetists ANESTY, and medical specialists MEDICINE. The expected sign on paediatrics PEDS in the opted-out regime is not clear – to the extent that they offer primary care one would have thought that their patient loads would not differ significantly from those of general practitioners. However, to the extent that some paediatricians are quite specialized they would behave more like the other medical specialists (cardiologists, neurologists, etc.) and carry larger patient loads. On balance we expect a positive effect.

We also expect that a physician's financial need will influence the way in which he draws patients from the pool, i.e. recall rates and followup. The variables indicating financial need are the number of dependants DEPENDTS,

with a positive sign expected; a dummy variable indicating that the physician's spouse is employed SPEMP, with a negative sign; and the expenses of practice, both salaries of non-physician personnel LABOUR and non-labour expenses OVERHEAD. We expect that higher practice costs, other things equal, will constitute a financial need in response to which the physician may increase his patient load.

We also anticipated that patient characteristics would affect practice load. The only direct measures we have on patients concern the age-sex distribution; and a variable representing the extent to which the physician specializes in certain kinds of patients (by age and sex categories) was introduced into the equation (SPECASEX). We anticipated that physicians who do so specialize will have smaller patient loads. Two other surrogate measures on patients were used: the average family income of the county AVINC and whether the practice was located in an urban setting URBAN; these are descriptive of the population from which the patients are drawn rather than of the patients themselves. We expect that both of these variables would have a positive effect on patient load.

As noted above, we anticipate a significant emulation effect on the size of the patient load, and we would expect therefore to observe a positive relationship between the practitioner's patient load TOTPAT and that of his peer group EMPAT, i.e. the average patient load of the other physicians in his specialty and county.

We also anticipate that access to hospital facilities NUMHOSP and ACTBED will increase the size of the patient load of specialists, in terms of both recruitment and manageability. The recruitment of patients may also be enhanced by membership on hospital committees NUMCOMMS and MAC[8]; manageability may be promoted by participation in a group practice GROUP.

The competitive pressures exerted by the presence of other physicians will presumably have a negative effect; the variables measuring these effects are OTHERDOC for the INGPS and ALLOUT samples, and SUBDOC (substitute doctors) for the INSPECS. On the other hand large numbers of general practitioners from whom one receives referrals might enhance the practice load of specialists (COMDOC in the INSPECS regime). For opted-out physicians the competitive pressures are stronger when the surrounding physician population is largely opted in, and thus we anticipate a positive relationship between

8 We have included both of these variables in the general practitioner specification, since serving on hospital committees can be considered a signal of peer approval for general practitioners. Service on committees (with the exception of the MAC, however) does not likely constitute such a signal in the case of specialists.

CPCTOUT and the patient load. Similarly, a high price PRICE should be negatively related to practice size if any deterrent effect is operative.

Finally, we expect that as the complexity of the service mix COMPLEX increases, the number of patients a physician would be able to handle would probably decrease. There may be instances, however, where the effect of complexity would be reversed; a physician specializing in sclerosing injections for varicose veins might be, as it were, a case in point.

THE WORKLOAD EQUATION (TOTDOL)

The three main ingredients in the workload equation are the patient load, the complexity of the service mix, and service intensity. The first two enter the TOTDOL equation directly with expected positive signs; service intensity, however, is unobserved, so we introduced the hypothesized determinants of this variable instead. The variables feeding into workload through service intensity include physician characteristics and financial need, patient characteristics, the availability of hospital facilities, and the use of diagnostic tests (complementary services).

The physician characteristics postulated to be influential in determining service intensity include the specialty dummies, teaching appointments, and a number of attitudinal variables. Because workload is defined in dollar volume terms we would expect the 'intensity' of servicing in terms of value of services per patient or per visit to reflect relative fees across specialties. All the specialties (except for certificants in the College of Family Physicians) enjoy fees that are higher on average than those paid to general practitioners (our silent dummy). We would therefore expect positive coefficients on all these variables, with two exceptions. Although anaesthetists do have relatively higher fee schedules, their compensation is based strictly on time units, and thus their ability to generate additional services is very limited vis-à-vis that of general practitioners; in this case we would anticipate the price effect to be dominated by the general practitioner's greater ability to increase quantity. Second, certificants of the College of Family Physicians enjoy no fee scale advantage, nor any advantage with respect to demand generation, so no positive coefficient is expected here; indeed, the ethos of the College, which stresses high-quality time-intensive care in contrast to the 'revolving door' model of practice, might suggest that lower service intensity in dollar volume terms would be observed.

We expect that because of other interests and sources of income, academic physicians would have lower service intensities and thereby smaller workloads, other things equal.

Several attitudes of physicians may be relevant to his choice of practice style. If a physician claims to take the cost of services into account when making medical decisions COST we would expect him to generate fewer services. Contrariwise, if he claims to be influenced by the patient's wishes PATWISH, he may not resist demands for additional care, and service intensity will arise. If he feels threatened by the monitoring activities of the Medical Review Committee of the College LESSMRC, we would expect him to hold down his servicing activities. Finally, for opted-out physicians only we expect a negative association between service intensity and opting out for ideological, as opposed to financial, reasons IDEOLOGY.

In addition to these physician characteristics, financial need stimulates increased service intensity, and we therefore anticipate positive signs on DEPENDTS, LABOUR, and OVERHEAD and a negative sign on SPEMP.

Patient characteristics are also relevant in the determination of service intensity. In particular, the urban location of the practice should increase intensity because of greater accessibility. We also expect richer patients AVINC to demand and receive more intensive servicing.

The generation of additional services is enhanced by the availability of hospital facilities (ACTBED and NUMHOSP) and by the use of diagnostic tests TESTS, and we expect positive signs on these variables in the equation.

Finally, in addition to the patient load, complexity, and intensity determinants of workload, we expect an emulation effect EMBILL to be operative here, just as in the case of TOTPAT.

THE QUEUE EQUATION (QUEUE)

As depicted in Figure 3, the determinants of the length of the queue are numerous. Physician characteristics and financial need again play a role, as do the availability of hospital facilities, the presence of other physicians in the area, the amount of patient self-referral, the size of the patient load and patient pool, and the complexity of the service mix.

The physician characteristics that we expect to be influential are teaching affiliation, years of practice in the present locality YRSLOCAL, group membership, and the specialty dummies. The first two indicate some kind of market power and ought to enable physicians to maintain a longer queue. Participation in a group practice ought to shorten the queue as physicians cover for each other, and scheduling is facilitated. One would guess that the average waiting times for appointments with specialists are, in general, longer than those for general practitioners, with the obvious exception of anaesthetists. An analogous argument might be made for a positive sign on the complexity variable.

We stated earlier that one of the motives for maintaining a queue was as a sort of insurance: should a physician suddenly need more income, a queue of patients from which to draw would be welcome. We therefore introduce the financial need variables into the equation with the usual expected signs – DEPENDTS (+), SPEMP (−), LABOUR (+), and OVERHEAD (+).

The presence of hospital facilities, particularly emergency and outpatient departments, and the availability of other physicians in the area will reduce the ability of a physician to maintain a long queue. For opted-out physicians, a high proportion of other opted-out physicians in the area will enhance their competitive positions and enable them to hold on to patients more easily. The urban location of the practice and the attendant accessibility to substitute services would presumably also reduce the length of the queue.

The interaction between patient pool, patient load, and queue is complex. Patients can be drawn from the pool either into the patient load or into the queue; the patient enters the patient load as such only by receiving service. Thus a large patient pool could provide a long queue with a given patient load, or, seen another way, increases in the patient load can be made at the expense of the queue. We anticipate, then, a negative coefficient on patient load TOTPAT in the queue equation.

Finally, patient self-referral is likely to reduce the queue in two ways. First, it may simply reflect people dropping off the end of the queue and seeking care elsewhere. Second, a high rate of patient self-referral may indicate poor quality care, and this in itself will reduce the ability of a physician to hold his patients on a queue.

HOURS OF WORK EQUATION (HOURS)

The number of hours of patient care is determined primarily by the service workload, but different physicians work at different paces, and the use of substitute resources can also affect the required input by the physician himself. We do anticipate, however, that workload will be a significant determinant of hours.

The physician characteristics of importance in this equation are: teaching appointments (with a negative sign), group participation (again negative), membership on hospital committees (negative, because of the time demands), and the specialty dummies. We expect that all the specialists work shorter hours than general practitioners, other things being equal – their fee structures are higher, and their income-leisure trade-offs are presumably no different. On the other hand we expect certificants of the College of Family Physicians to spend longer with their patients, and thus a positive coefficient on the CCFP dummy variable is anticipated.

The average income of the patients may also be positively related to the amount of time spent in patient care, if wealthier patients are more demanding of a physician's attention than poorer ones.

Having numerous hospital appointments increases the hours of work through travel time; an urban location reduces them.[9]

Given any workload, greater financial need will induce the physician to work longer hours and reduce the level of substitute inputs. Thus we expect a positive sign on DEPENDTS and a negative one on SPEMP. The effects of LABOUR and OVERHEAD on HOURS are more complicated. To the extent that these constitute practice expenses, they create financial need, and this necessitates more work for the physician to pay for them. Positive signs would accordingly be expected. However, given any workload, LABOUR and OVERHEAD represent technical substitutes for physician time, at least to some degree, and thereby could be expected to generate negative effects. On balance, we anticipate the latter effect to dominate the 'financial need' aspects of expenditures on labour resources, though not on practice overhead.[10] Accordingly, we anticipate a negative coefficient on LABOUR and a positive one on OVERHEAD. Finally, we asked physicians at the time of the interview if there had been any major changes in their practices in the previous eighteen months. If a physician responded that his hours of work had increased markedly, he was given a value of 1 in the dummy variable CHANGHRS. It was necessary to measure this phenomenon, since the hours of work data referred to 'the last typical week' at the time of the interview in fall 1976, whereas the workload data related to the period from May 1975 to January 1976. We expect, then, that physicians whose hours had increased over this period would have higher hours, other things, such as our measured workload, being equal.

THE LABOUR AND OVERHEAD EQUATIONS (LABOUR AND OVERHEAD)

We shall discuss the specifications of these two equations together since they are very similar, both representing various aspects of non-physician practice inputs and therefore practice expenses.

Figure 5 indicated that the practice resources mustered by a physician will depend upon his own characteristics and financial need, his practice work-

9 The hours-of-work variable excludes committee work, paperwork, continuing education, etc., but includes travel time associated with patient care.

10 Paramedical personnel are more likely than equipment, for example, to serve as physician substitutes rather than complements.

load and the complexity of services within that workload, his own input of time, the competitive environment provided by other physicians in the area, and the hospital facilities in the area. Reinhardt (1972) in his work on the production of physician services noted that physicians underuse paramedical personnel in an efficiency sense and speculated that they may resist employing such resources because of the distaste they have for a managerial role. On the other hand, Contandriopoulos (1976) found that physicians tended to overemploy such personnel. Whatever the final effect, physician characteristics will clearly play an important role in determining the structure of the practice.

We hypothesize that physicians who expressed favourable attitudes to team medicine in our survey would use more labour resources; moreover, those who favoured teams with a rotating leadership depending on the patient's need PARATEAM should use more personnel than those who insisted on physician captaincy PARASUP. We also hypothesize that physicians who feel harassed by their patients HARASS might hire more personnel, both to serve as a buffer and to handle some kinds of patients themselves. There is no reason to suppose that these factors would affect the use of non-labour resources.

One would guess that academic physicians with the resources of the teaching hospitals at their disposal would have fewer of their own practice resources, both labour and non-labour. For analogous reasons we anticipate a negative coefficient on NUMHOSP in both the LABOUR and OVERHEAD equations.

The specialty to which a physician belongs is also likely to have an effect on the use of practice resources. Some specialties simply need more equipment and auxiliaries than others for technical reasons; furthermore, some specialties depend more heavily upon hospital as opposed to private office facilities. We might therefore suppose that psychiatrists, anaesthetists, surgeons, and perhaps obstetricians and gynaecologists would have lower labour expenses than general practitioners, though the obstetricians and gynaecologists may have higher non-labour expenses (equipment and examining rooms). On the other hand medical specialists and paediatricians are likely to have similar or greater expenses, relative to those of general practitioners, as are certificants of the College of Family Physicians.

We would anticipate that group membership would reduce the costs of space and equipment for any individual physician (shared use) but might provide the critical mass for hiring specialized kinds of paramedical personnel and therefore have a positive effect on LABOUR. On the other hand a shared use of labour resources as well could result in a negative sign on the group practice variable GROUP.

One would expect that physicians in financial need would tend to keep practice expenses down, and we therefore anticipate a negative sign on DEPENDTS and a positive sign on SPEMP in both equations.

The role of LABOUR in the OVERHEAD equations and vice versa is more complicated. To some extent labour and 'capital' are substitutes, and negative coefficients would be expected. Furthermore, expenses on either one constitute an increase in 'financial need,' so that one might expect some 'economizing' on other practice expenses. On the other hand in the production of medical services, particularly of a technical sort, labour and capital resources may be complementary. In general, nurses and secretaries need space and facilities; equipment cannot be productive unless there are trained personnel to use it. These complementarities would lead us to expect a positive sign on the LABOUR coefficient in the OVERHEAD equation and vice versa. A priori, it is hard to judge which of these opposing effects will dominate, although the complementary relationship seems likely.

We might, however, expect a dominance of the substitution effect over the complementary relationship between the physician's hours of work HOURS and the use of auxiliaries LABOUR, though the complementarity argument might again be expected to dominate the effect of HOURS on OVERHEAD and thus produce a positive coefficient in that equation.

The requirements for practice resources of all kinds imposed by the practice workload TOTDOL and service complexity COMPLEX can be expected to increase the use of labour and non-labour inputs.

Finally, some external factors can be expected to influence the level of practice resources. The availability of hospital facilities represents a competing demand for auxiliaries of all kinds and might raise their wage level in physicians' offices, although this might also reduce the supply of available labour. The price effect alone would yield a positive coefficient of ACTBED in the LABOUR equation. On the other hand the availability of specialized equipment in the hospital reduces the need for physicians to similarly equip their offices; we might then anticipate a negative coefficient of ACTBED in the OVERHEAD equation.

An urban environment is likely to have opposing effects. The increased supply of auxiliaries will show itself in a positive coefficient on the URBAN variable in the LABOUR equation, although this may be somewhat mitigated by the concomitant downward pressure on wage rates. The effect of URBAN on OVERHEAD is likely to operate mainly through higher office rents and thus yield a positive coefficient.

Finally, it is likely that the presence of other physicians in the area will have some effect on the level of practice resources. To the extent that

competition from other providers induces physicians to enhance their product with more attractive surroundings and auxiliary personnel, a positive effect might be anticipated. On the other hand the demand for labour represented by these other physicians would decrease their availability for any particular physician (again we might have a second-order wage effort working in the opposite direction). On balance we anticipate a positive effect in the OVERHEAD equation and a negative effect in the LABOUR equation, with the exception of the SUBDOC variable in the opted-in specialists labour equation where we anticipate that a large number of competing physicians in the same specialty might induce product-enhancement strategies through personnel as well as premises.

THE TESTS EQUATION

The use of services complementary to a physician's own, mainly diagnostic tests, is postulated to depend upon characteristics of the physician determining his practice style, his level of financial need (causing demand generation behaviour), the characteristics of his patients, the complexity of his service mix, and the size of his patient load (simply a scale effect, since testing is measured in terms of aggregate practice activity). The physician characteristics determining his 'ordering' style would include academic appointments, specialty, group membership, years in practice, and several attitudinal variables. We would expect academic physicians to do more testing, partly because of the availability of laboratory facilities, partly because many of the tests ordered in their name are actually requisitioned by interns and residents, whose test-ordering behaviour is notorious (whether because of insecurity or academic curiosity). On the other hand Pineault (1976 and 1977) suggests that in cases where the diagnosis is clear, academic physicians may order fewer tests than their less expert colleagues. This effect may be somewhat enhanced in the case of full-time academic physicians by their reduced need for income generation through servicing of patients.

We anticipate that surgeons and internists would order more tests than general practitioners (their patients are generally more sick); certificants of the College of Family Physicians may express their concern for in-depth and continuing care through increased use of investigations. Clearly, anaesthetists and psychiatrists will order fewer tests, and this might also be the case for obstetricians and paediatricians.

We anticipate that membership in a group practice might increase the ordering of tests since some groups have their own laboratories, and their members have a direct financial interest in having these investigations done.

There is some reason to suppose that the longer a physician has been in practice YRSPRAC the fewer tests he will order, since his medical training did not emphasize the use of diagnostic procedures to the same extent as the current medical school program, and diagnostic experience may obviate the need for much testing in many cases. In the same vein we postulate that a conservative ideological position, reflecting as it does a more traditional and non-technological approach to medical practice, may be associated with lower testing rates. Two other attitudinal variables are introduced into the TESTS equation. Those physicians who indicated in the interview a concern for the costs of care in making medical decisions COST would be expected to order fewer tests. On the other hand those physicians who claimed to take their patients' wishes into account PATWISH might order more tests at the requests of their patients.

We hypothesize that, since ordering tests enables the physician to increase his own servicing through followup visits, use of these complementary services will be positively related to the physician's financial need; DEPENDTS, LABOUR, and OVERHEAD are expected to have positive coefficients in the TEST equation, SPEMP a negative one.

Characteristics of the patients are also likely to be important. Anecdotal evidence suggests that richer patients demand more tests; the availability of laboratories in urban areas will make it easier for patients in these areas to get testing done.

Finally, it is hypothesized that the complexity of the service mix, to the extent that it reflects the treatment of unusual conditions, will be associated with greater use of diagnostic tests and procedures.

THE REFERRALS EQUATION (REFS)

The extent to which a physician refers patients to other physicians is related to many factors, as shown in Figure 8.

Certainly referral is part of a physician's practice style that depends upon his personal characteristics. Academic physicians can be expected to make relatively many referrals; they are well 'plugged into' the medical network and have less to fear in terms of loss of patients than do their non-academic counterparts. Those physicians who indicate divergence from the mainstream of the medical political community (either LIBERAL or CONS) might be expected to have lower referral rates. Those physicians who indicate concern for the costs of medical care COST might be expected to have lower referral rates. On the other hand those who take their patients' wishes into account PATWISH might more readily accede to the request for a second opinion and thereby increase their rate of referral. In addition, physicians who

feel harassed by their patients may try to 'unload' them through the referral process.

The specialty dummies are likely to have a significant effect in the referral equation. It is reasonable to suppose that general practitioners do more referring than specialists, and thus all the specialty variables (including the quasi-specialty certificants of the College of Family Physicians) can be expected to have negative coefficients.

To the extent that referral of patients sometimes constitutes loss of income, those physicians with relatively great financial need might be expected to have relatively low referral rates. Thus we anticipate negative coefficients on DEPENDTS, LABOUR, and OVERHEAD, and a positive coefficient on SPEMP.

Just as in the case of TESTS; one would anticipate that the average income of the community and an urban setting would be positively related to patient-initiated demand for referral. The size of the patient load will have a straightforward scale effect on the number of referrals.

The complexity of the service mix provided by a physician is likely to affect the pattern of referrals, although the net impact is uncertain. On one hand physicians offering a special kind of service are more likely to refer away patients who do not need their particular expertise; on the other hand the need to refer because of incapacity to provide specialized care is perhaps less for these physicians. One might expect the latter effect to dominate.

Since referral patterns form one of the most tangible mechanisms for interprofessional linkage, it is likely that the emulative effect on practice behaviour will be particularly strong in this area. Thus we anticipate that where a physician's peers do a lot of referring of patients EMREFS this practice style will be adopted by the physician himself, so as not to lose favour with his colleagues.

Even more direct linkages are provided by hospital affiliation and group membership. We postulate that, for general practitioners at least, hospital privileges not only provide information about specialist consultants but often carry with them implicit expectations of referral to the specialist staff. In terms of group effects we hypothesize that members of mixed specialty groups MIXGROUP will have high intragroup referrals, especially if there are income-sharing features to the association.

Finally, the competitive effects of other physicians in the area (OTHERDOC and SUBDOC) will cause the physician to hold on to his patients more and refer them less. On the other hand we anticipate that opted-out physicians faced with competition from a predominantly opted-in surrounding physician population (low CPCTOUT) will use a vigorous referral pattern to establish the linkages necessary to flourish in that medical community. Accordingly, we anticipate a negative coefficient on this variable in the REFS equation.

THE PATIENT SELF-REFERRAL EQUATION (SELFREFS)

It will be recalled that patient self-referral is the only 'quality of care' variable in the model. It actually represents only one aspect of quality of care, patient satisfaction, and even here the measure is relevant only for general practitioners. (SELFREFS measures the dollar volume of services received from other physicians on an unreferred basis by a general practitioner's patients.) For these physicians it might be argued that evidence of systematic doctor-switching or doctor-shopping is an indicator of patient dissatisfaction and therefore of a poor quality of care.

Obviously many of the factors determining self-referral relate to other aspects of practice behaviour. We postulate, then, that, other things being equal, a heavy workload will reduce the time available for each patient and thus lead to self-referral away. A similar result can be expected by a reduction in hours of work. A long queue will lead to switching as patients 'drop off the end' and seek care elsewhere. As practice resources, both labour and non-labour, are increased, the ability of the physician to care adequately for his patients should be enhanced and self-referral should decrease. Finally, as the physician himself increases the referral rate, *self*-referral by his patients should decrease accordingly.

There are, of course other variables which impinge upon the self-referral process. The availability of other physicians and the location of the practice in an urban setting are likely to enhance self-referral. Furthermore, wealthier patients are often better informed about alternative providers and may be less willing to tolerate inferior treatment.

In terms of physician characteristics one would expect that academic appointment and certification by the College of Family Physicians might be indicators of high quality and therefore low patient self-referral. Patients' loyalty is presumably related to years in practice YRSPRAC and, more particularly, years in the present location YRSLOCAL. We would expect both to have a negative effect on self-referral.

Finally, physicians who claim to be sensitive to their patients' wishes PATWISH should have less self-referral; those who claim to be harassed might expect more switching and doctor-shopping among their patients.

THE PRICE EQUATION

For opted-out physicians we also specify an equation for the average price they charge their patients. Since the price physicians can charge is a reflection of their market power, among other factors, we will specify this equation in

terms of this category of variables, as well as physician characteristics and financial need and patient characteristics. As in the case of the OPTION equation, then, we are interested in those conditions which allow a physician to extra-bill his patients in the context of a surrounding system predominantly free from direct user charges.

There are a number of ways in which a physician gains 'market power.' Academic posts, with their attendant kudos, give physicians a competitive edge. On the other hand one might guess that university pressures might inhibit the charging of high prices, so that at least for full-time teachers the financial incentive to raise prices may be reduced, if not eliminated, by the salary component of their incomes. The net effect on prices is thus indeterminate, though one might expect higher prices for part-time than for full-time academic physicians.

A similar indication of high professional status within the medical community is provided by hospital committee membership NUMCOMMS and especially membership on the Medical Advisory Committee MAC. Not only is this a 'quality' indicator but committee work also provides contacts for referrals which are probably less price-sensitive in general than patient-initiated demand for services. We thus anticipate positive coefficients on these variables in the PRICE equation.

The competitive environment provided by other physicians in the area should, according to basic economic principles, have a marked effect on price. We would expect that as the supply of same-specialty physicians per capita in the area rose SUBDOC the prices charged by opted-out physicians would fall. Similarly, as the proportion of these other physicians who have also opted out rises the competitive disadvantage of any one opted-out physician decreases, and he might be able to charge a higher price.

Certain characteristics of the physician's own practice might indicate local market power. The number of years in the locality YRSLOCAL might be associated with higher prices, as physicians can rely on patients' loyalty to counteract to some extent the deterrent effect of prices. If a physician serves a special type of patient SPECASEX, this might enable him to charge higher prices. Finally, membership in a group practice spreads the financial risks associated with charging relatively high prices; we would thus expect a positive coefficient on the GROUP variable in the PRICE equation. Membership in a mixed-specialty group might have an added effect since intragroup referrals can mitigate the risk of losing patients through resistance to relatively high prices. We would anticipate that whereas both group dummy variables would have positive coefficients in the price equation, the coefficient on MIXGROUP should be larger than on GROUP.

In addition to market power indicators, other characteristics of a physician might influence his pricing decision. We would anticipate that those physicians who claim to have opted out for ideological rather than financial reasons would have lower prices. Similarly, those who espouse a political position more liberal than that of the OMA might be expected to moderate their charges. An expressed concern for the costs of medical care as a consideration in medical decision-making COST might be accompanied by restraint in setting prices. Finally, an antipathy to the activities of the Medical Review Committee of the College LESSMRC might lead physicians to substitute the price instrument for demand generation which exposes them to MRC scrutiny through increased OHIP payments to their patients. We would therefore anticipate a positive sign of the coefficient of LESSMRC in the PRICE equation.

In general, we expect that most opted-out physicians face a demand for their services (exogenous and generated) which has a price elasticity of less than one. In other words a rise in prices will not be accompanied by a proportionate decline in services provided and thus will yield an increased income. Given this assumption, we would expect those physicians with relatively large financial needs to charge relatively high prices. Thus we anticipate positive coefficients on DEPENDTS, LABOUR, and OVERHEAD, and a negative coefficient on SPEMP.

The effect of the specialty dummy variable in the price equation is somewhat ambiguous. Some specialties might be expected to exercise more local market power than others, though which these might be is not entirely clear on an intuitive basis. It is probable that those physicians who opt out because of dissatisfaction with their relative fee structure (vis-à-vis other specialties), as opposed to dissatisfaction with the over-all level of fees, would charge relatively high prices. This situation is characteristic of general practitioners in the extreme, but psychiatrists and (to a lesser extent) anaesthetists have relatively disadvantageous fee structures since they are based on time units rather than service items. Since the coefficients on the specialty dummies indicate differences from the prices charged by general practitioners (the 'silent' dummy in the price equation) we would anticipate, on the basis of this reasoning, negative coefficients for all the specialties except perhaps psychiatry. However, there is no reason to assume that certificants of the College of Family Physicians CCFP would have lower prices than other general practitioners. Their price structure is equally low in terms of the OMA schedule, and their assumption of quasispecialist status might in fact induce them to charge even higher prices than non-certified general practitioners. On the other hand as noted in the specification of the OPTION equation,

TABLE 23

Summary of specifications of the model

Explanatory Variable \ Dependent Variable	TOTPAT	TOTDOL	QUEUE	HOURS	LABOUR	OVER-HEAD	TESTS	REFS	SELF-REFS	OP-TION	PRICE
ACTBED	GSO +	GSO +	GSO –		GSO +	GSO –					
ANESTY	SO +	SO –	SO –	SO –	SO –	SO –	SO –	SO –		+	–
AVINC	GSO +	GSO +		GSO +			GSO +	GSO +	+	+	+
BIRTHENG										+	
BIRTHOTH										–	
CCFP	G O +	G O –		G O +	G O +	G O +	G O +	G O –	–	+	+
CHANGHRS				GSO +							
COMDOC	S +				S +						
COMPLEX	GSO –	GSO +	GSO +		GSO +	GSO +	GSO +	GSO –			
CONS							GSO –	GSO –		+	
COST		GSO –					GSO –	GSO –			–
CPCTOUT	O +		O +				O –			+	+
DEPENDTS	GSO +	GSO +	GSO +	GSO +	GSO –	GSO –	GSO +			+	+
EMBILL		GSO +									
EMPAT	GSO +										
EMREFS								GSO +			
FULLTIME	SO –	SO –	SO +	SO –	SO –	SO –	SO +	SO +		–	+
GRADSCL										+	
GROUP	GSO +		GSO –	GSO –	GSO +	GSO –	GSO +				+
HARASS					GSO +			GSO +	+		
HOURS					GSO –	GSO +			–		
IDEOLOGY		O –									–
LABOUR	GSO +	GSO +	GSO +	GSO –		GSO +	GSO +	GSO –	–		+
LESSMRC		GSO –								+	+

TABLE 23 Continued

Explanatory Variable \ Dependent Variable	TOTPAT	TOTDOL	QUEUE	HOURS	LABOUR	OVER-HEAD	TESTS	REFS	SELF-REFS	OP-TION	PRICE
LIBERAL								GSO –		–	–
MAC	GSO +			GSO –						+	+
MEDICINE	SO +	SO +	SO +	SO –	SO +	SO +	SO +	SO –		+	–
MEDVSGOV										+	
MIXGROUP								GSO +			+
NUMCOMMS	G +			GSO –							+
NUMHOSP	SO +	GSO +		GSO +	GSO –	GSO –		G +			
OBSGYN	SO –	SO +	SO +	SO –	SO –	SO +	SO –	SO –		+	–
OPTION											
OTHERDOC	G O –		G –		G O –	G O +		G O –	+	–	
OVERHEAD	GSO +	GSO +	GSO +	GSO +	GSO +		GSO +	GSO –	–		+
PARASUP					GSO +						
PARATEAM					GSO +						
PARTTIME	GSO –	GSO –	GSO +	GSO –	GSO –	GSO –	GSO +	GSO +	–	+	+
PATWISH		GSO +					GSO +	GSO +	–		
PEDS	O +	O +	O +	O –	O +	O –	O –			+	–
PRICE	O –										
PSYCH	SO –	SO +	SO +	SO –	SO –	SO –	SO –	SO –		+	+
QUEUE									+		
REFS									–		
RELPOV										–	
SELFREF			G –								
SPECASEX	GSO –										+
SPEMP	GSO –	GSO –	GSO –	GSO –	GSO +	GSO +	GSO –	GSO +		–	–
SUBDOC	S –		SO –		S +	S +		S –			–
SURGERY	SO +	SO +	SO +	SO –	SO –	SO –	SO +	SO –		+	–

TABLE 23 Continued

Explanatory Variable \ Dependent Variable	TOTPAT	TOTDOL	QUEUE	HOURS	LABOUR	OVER-HEAD	TESTS	REFS	SELF-REFS	OP-TION	PRICE
TESTS		GSO +									
TOTDOL				GSO +	GSO +	GSO +			+		
TOTPAT		GSO +	GSO –				GSO +	GSO +			
URBAN	GSO +	GSO +	GSO –	GSO –	GSO +	GSO +	GSO +	GSO +	+	+	
YRSLCN2	GSO –										
YRSLOCAL			GSO +						–	+	+
YRSPRAC	GSO +						GSO –		–		
YRSPRACSQ	GSO –										

those specialties with relatively little discretionary power to generate services, such as obstetrics and gynaecology, anaesthesia, and perhaps surgery, have greater incentives to opt out and use the price instrument to generate higher incomes as an alternative to increased utilization. In this regard we might expect general practitioners to have relatively low prices. However, although the demand generation potential for opted-in general practitioners is probably great, general practitioners who do opt out might find this discretionary power much reduced by their patients' resistance once direct charges are faced and may find it easier to raise the price per service than increase the number of services. The net effect is therefore indeterminate, but on balance we might expect general practitioners and psychiatrists to have relatively high prices, and among the other groups we would anticipate lower prices for medical specialists and paediatricians than for surgeons and obstetricians.

Finally, one patient characteristic can be expected to affect the prices charged, namely income. It is reasonable to suppose that physicians located in rich areas (high AVINC) might encounter less resistance to direct charges and thus raise their prices to a relatively high level.

The specifications of the model are summarized in Table 23. The symbols G, S, and O indicate that an explanatory variable appears in the INGPS, INSPECS, and ALLOUT regimes respectively. The plus and minus signs indicate the hypothesized direction of influence of the explanatory variable on the dependent variable.

This concludes our specification of the equations in the model; we have identified all the explanatory variables that will be introduced in each equation for the three regimes: opted-in general practitioners, opted-in specialists, and all opted-out physicians. Furthermore, we have described what we expect regarding the direction of the effects of these variables, the signs of the regression coefficients. Before proceeding to discuss of the results of the empirical analyses in the next chapter, we need, finally, to consider some of the econometric problems encountered in the estimation of this model and the solutions we have adopted.

ECONOMETRIC METHODS

The model specified above really comprises two different components: first, the equation relating to the option decision itself and, secondly, given the results of this decision the three 'regimes' within which various aspects of practice behaviour are related to each other and to exogenous variables. The option equation itself is not specified in terms of any other practice behaviour variables; the option decision is modelled as depending only on predetermined variables.

This theoretical structure presents some difficult problems from the point of view of econometric estimation. A rigorous treatment of them is available in Poirier (1979); we present here the main features of these problems and the solutions adopted to deal with them.

To begin with the option equation itself, because this is a dichotomous dependent variable it is apparent that the normality assumptions required for ordinary least squares estimation are violated. Accordingly, we decided to use a PROBIT technique, which estimates the probability of any physician's opting out, given his values on a set of exogenous explanatory variables. The coefficients on these explanatory variables then represent their marginal effects on increasing the probability of opting out (a positive coefficient indicating an increase in probability, and a negative coefficient a decrease).

Within each of the three regimes we have the problems associated with the estimation of a simultaneous equation system. Basically, the ordinary least squares estimation of the parameters of a simultaneous system are biased, because in any equation we cannot make the necessary assumption of independence between the endogenous explanatory variables and the error term. Accordingly, we adopted a two-stage estimation procedure, using the fitted values of the endogenous variables, derived from a reduced form ordinary least squares estimation,[11] in lieu of the observed values of these variables whenever they appeared on the right-hand side of any equation. This technique purges the equation of the correlation between the endogenous explanatory variables and the error term and thereby removes this source of bias in the estimated coefficients. But the purge is not without cost. If the reduced form equations yielding the fitted values for the endogenous variables do not have high explanatory power, the two-stage estimation procedure does introduce considerable 'noise' into the system, and although the estimated coefficients will be unbiased their standard errors may increase, and the explanatory power of the second-stage equations may be compromised. Accordingly, as a check, we estimated the 'structural' equations specified above with ordinary least squares as well as with the two-stage procedure in order to get a sense of how much potential explanatory power was lost in the attempt to get unbiased estimates of the regression coefficients.

An additional, somewhat intricate econometric problem needed to be addressed. Although the option equation is recursive (i.e. having no endogenous explanatory variables), it is endogenous in the entire model, and thus we have to take into account, in estimating the simultaneous systems in

11 The reduced form is simply the regression of the dependent variable on the entire set of independent variables appearing anywhere in the system of equations.

the three regimes, any potential correlation between the error term in the option equation and the error terms in the structural equations of the three systems. Failure to do this might result in biased estimators for the regression coefficients in these structural equations. This kind of econometric model is called a 'switching regression model'; in our case the option decision serves this switching function, allocating physicians to either in or out regimes. One addresses the problem of potential correlation between the error term in the switching equation and the error terms in the structural equations by generating what are known as 'sample selectivity regressors' from the estimated option equation and introducing them as explanatory variables in every structural equation.[12] One can interpret the introduction of these sample selectivity regressors (SSRs) in a manner analogous to the use of fitted values for the endogenous explanatory variables in a simultaneous system; it represents an attempt to purge the structural equations of the effects of correlations between their error terms and the error term of the switching regression. Intuitively one can interpret the coefficients on the sample selectivity regressors as measures of the effects of unobserved factors influencing both the option decision and the behaviour represented by the structural equation. We do not have any a priori expectations of the directions of the effects of the SSRs; rather, we introduce them into the two-stage estimation procedure simply to purge the structural coefficients of a potential source of bias.

This concludes our discussion of the theoretical and econometric issues associated with our multivariate analysis of physician practice behaviour. The orientation of this study, namely an examination of the determinants and effects of opting out, is reflected in our model. Our point of departure is the option decision, which is treated as prior to and separate from other practice behaviour decisions. Then, contingent on the option, we estimate separate behavioural systems in the three regimes, taking into account possible correlations between the error terms of the regime equations and that in the switching option equation. The next chapter presents the results of our statistical estimation of this model.

12 A full explanation of this methodology is contained in Poirier (1979).

5

Results of the multivariate analyses

This chapter reports the results of our estimations of the model. We begin with the results of the probit estimation of the option equation. In the 'switching' regression model, the probit estimation produces sample selectivity regressors, described in chapter 4, which are then introduced as explanatory variables in all the equations in each of the three regimes: opted-in general practitioners, opted-in specialists, and all opted-out physicians. The results on each equation are reported in turn, commencing with the option equation. To highlight the similarity or difference in the factors determining behaviour in each aspect of practice activity we discuss the results across regimes for each equation instead of considering the set of equations for each regime separately. Nevertheless, it should be remembered that in the case of the two-stage least squares results the coefficients of all equations are estimated simultaneously for each regime as a whole.

The tables also show the results for each equation using a non-simultaneous, ordinary least squares (OLS) estimation procedure. We do this for the following reason. The OLS results, while they do not yield unbiased estimates of the coefficients, frequently have greater over-all explanatory power. The loss in explanatory power in moving to the 'cleaner' two-stage procedure can be due not only to the removal of spurious explanatory effects of endogenous regressors but simply to the introduction of 'noise' into the stochastic regressors used in the second stage if the reduced form equations for these endogenous variables do not have good fits. In this case some of the 'true' explanatory power of the endogenous regressors may be lost in the attempt to purge them of the spurious effects, and the baby may be thrown out with the bathwater. Table 34 provides the R^2's for the reduced form equations in each regime used to generate the stochastic regressors for the second stage of the analysis to assist the reader in making his own judgments about the relative value of the ordinary least squares and two-stage least

squares results. Our discussion will draw upon both the OLS and the two-stage results.[1]

The results do not always accord exactly with the specifications developed in the previous chapter. This reflects our efforts to take into account the disruptive effects of multicollinearity in securing stable estimates of the coefficients on the explanatory variables. Fortunately there was relatively little collinearity among the variables, surprisingly little in fact, so the adjustments in the specifications were minor. Nevertheless, in several equations one or more of the explanatory factors suggested in chapter 4 do not appear, since other correlated variables performed better in the estimation of the equation. Generally, several specifications were estimated for each equation, and the best results only are reported here; it would be excessively cumbersome to report all the iterations. It is safe to conclude, therefore, that the results presented are fairly free from the usual qualifications associated with multicollinear explanatory variables. The means and standard deviations of the variables used in the regression are presented in appendix D.

THE OPTION EQUATION (OPTION)

The results of the estimation of this equation are presented in Table 24.[2] The over-all fit of the option equation was impressive. The equation itself was

1 One further note on the relative merits of the OLS and 2SLS estimates: the computer program used for the two-stage procedure did not produce entirely accurate estimates of the standard errors of the coefficients. In particular, no account is taken of the increased variance associated with the use of a stochastic regressor, and thus our estimated standard errors are biased downwards. It is unlikely that this effect is quantitatively large, but the significance levels cited for the 2SLS estimated are biased upwards. The same problem occurs in the case of the probit analysis of the option equation. Here too the computer programme was incapable of producing accurate standard errors, and the resulting significance levels are biased upwards.

2 In all the tables of chapter 5, the dependent variable is indicated in the top left-hand corner, the explanatory variables are listed alphabetically after the constant term with one row for each. The entries in the table are the regression coefficients for the explanatory variables with the standard errors given in parentheses beneath each coefficient. A single asterisk beside the standard error indicates a level of significance of 95 per cent; two asterisks indicate a 99 per cent significance level. A one-tailed t-test is used to test the hypothesis respecting the influence of explanatory variables on the dependent variables. Coefficients with counterintuitive signs simply lead to a rejection of the stated hypothesis, even though the coefficients may be large relative to their standard errors. In tables 25 through 33 the R^2, $\bar{R}^2$ and F-statistics are provided at the end of the table; these statistics are not meaningful for the probit results presented in Table 24. In Tables 25 through 32 the three columns for each explanatory variable present the coefficients in each of the three regimes: opted-in general practitioners (INGPS), opted-in specialists (INSPECS), and all opted-out physicians (ALLOUT). In Table 33 the two columns relate to two different dependent variables in two different regimes, SELFREF for INGPS and PRICE for ALLOUT.

TABLE 24

The option equation (OPTION)

CONSTANT	−0.3745	MAC	0.0496
	(1.798)		(0.182)
ANESTY	−0.6880	MEDICINE	1.029
	(0.393) (c)		(0.602)
AVINC	0.1928	MEDVSGOV	−0.0267
	(0.873)		(0.247)
BIRTHENG	0.4601	OBSGYN	0.5502
	(0.324)		(0.507)
BIRTHOTH	−0.1852	OTHERDOC	−0.1983
	(0.273)		(0.225)
CCFP	0.2009	PARTTIME	0.5646
	(0.278)		(0.216) **
CONS	0.3612	PEDS	−0.3473
	(0.229)		(0.478)
CPCTOUT	0.0366	PSYCH	0.1872
	(0.007) **		(0.631)
DEPENDTS	0.0842	RELPOV	−3.973
	(0.051) *		(1.829) *
FULLTIME	−0.2692	SPEMP	0.0577
	(0.421)		(0.215)
GRADSCHL	0.4940	SURG	0.5684
	(0.269) *		(0.453)
LESSMRC	0.6619	URBAN	0.8568
	(0.233) **		(0.295) **
LIBERAL	−0.3983	YRSLOCAL	0.0166
	(0.219) *		(0.009) *

NOTE: A glossary of variables is provided in appendix C.
Single asterisk implies significance at the 95 per cent level; double asterisk implies significance at the 99 per cent level.
(c) implies a counter-intuitive result with small relative standard error – i.e. would be significant if the reverse hypothesis were being tested.

significant at the 99 per cent level (see Poirier, 1979), and a good number of individual variables were significant as well. The signs on almost all variables were in the directions predicted in the last chapter. The most powerful variable in this equation was a characteristic not of a physician but of the medical community of which he is part: the percentage of a physician's local peers who are opted-out CPCTOUT. Indeed, the power of this variable was the most striking finding of this equation. It may be that we did not capture the characteristics of a local environment which led physicians of a given specialty to opt out and that the CPCTOUT variable picked up some of these unobserved effects. We have argued, however, that it was peer support itself – economic political, and social – which was important in leading physicians to opt out

and to maintain that status, and we shall return to this argument in the next chapter.

Another community characteristic which entered significantly – URBAN location – may also reflect some historical influence. The fact that urban physicians were significantly more likely than rural physicians to opt out may be a function of a difference on the demand side in tastes for more differentiated products and on the supply side in willingness or unwillingness to exploit favourable competitive positions; it may also simply be a legacy of the PSI experience as discussed in the last chapter.

A number of market power variables – years of practice in present locality YRSLOCAL, part-time teaching appointment PARTTIME, and Ontario medical education GRADSCHL – enter positively and significantly.

Only two of our 'financial need' variables were significant. The more dependants a physician has DEPENDTS and the lower the ratio of the average billings in his specialty to the over-all average RELPOV, the more likely is he to opt out.

Our ideological variables were more powerful. As expected, we found that 'liberalism' LIBERAL relative to the OMA decreased the likelihood of opting out, while 'conservatism' CONS increased that likelihood, although only the liberalism variable was significant at the 90 per cent level. Furthermore, attitudes toward government power had little influence upon the option decision – even at the margin. Not only was the attitude that the medical profession should have more power than government MEDVSGOV very insignificant in this equation – but it also entered with a negative sign! However, attitudes towards the Medical Review Committee were very significant and of considerable power. Believing that the MRC has too much power LESSMRC increased the probability of opting out. The marginal effect of this variable was considerably more significant than the effect captured by the bivariate analysis in chapter 3 but that is not surprising. As we noted in that chapter, the MRC not only is seen to constrain the entrepreneurial discretion of physicians but also stands as a political symbol of the erosion of medical 'independence.' Whether the motivation for opting out is financial or ideological, then, antipathy towards the MRC may strengthen it.

Finally, one of the most interesting results of this equation was the finding that, despite very different opting-out rates across specialties, our specialty group dummies had little effect once the variables so far discussed have been taken into account. Only two (ANESTY and MEDICINE) had coefficients that were large relative to their standard errors, but the sign on the former was unexpected. Anaesthetists, despite their relatively high opting-out rates, appeared less likely at the margin to opt out than general practitioners. Anaesthetists were likely to face a substantial opted-out segment of their

local peer group and to be located in richer counties, and they had relatively low ratios of mean OHIP billings to the grand mean, all of which might indicate greater tendencies to opt out. But the individual anaesthetist is less likely to opt out than another physician with similar values on these variables. Despite the incentive given by his limited discretion over his workload for an anaesthetist to opt out, the constraint imposed by referring physicians who may have to justify their choice to their patients seems real. This may be a particularly strong effect in the case of the eight general practitioners in our sample who, because they do exclusively anaesthetic work, have been included in the anaesthesia group. Their limited prestige and market power may make it especially difficult for them to opt out.

THE TOTAL PATIENT EQUATION (TOTPAT)

The results for the estimation of the patient equation in each of the three regimes are presented in Table 25. For this equation and for succeeding ones our discussion is limited to the statistically significant findings, coefficients with unexpected signs, and results that either confirm or differ from the bivariate analyses of chapter 3.

In the TOTPAT equation for the opted-in general practitioner were several interesting results. The general fit for the regression was not very high ($\bar{R}^2 = 0.22$), though it was very significant and, for a cross-sectional study, fairly creditable. There was only one counterintuitive result, where the coefficient was large relative to its standard error. In the two-stage equation, overhead expenses had the expected positive effect on the patient load generated; in the ordinary least squares regression this effect was joined by a significant positive coefficient on labour expenses and by significant negative coefficients on the age-sex specialization variable SPECASEX and the dummy variable for new practices YRSLCN2. In both two-stage and OLS estimations there was a positive coefficient on the complexity variable, a counterintuitive result, with only a small probability that this was a chance result. We had anticipated that those general practitioners providing specialized services would have smaller patient loads; this turned out not to be the case. Possibly the specialized services are of the kind that generate high volume in terms of patients, e.g. group psychotherapy, or it may be that the quasispecialization itself 'advertises' the physician and thereby attracts more patients. In any event, our original hypothesis with respect to the COMPLEX variable is rejected by these results.

Of all the other variables introduced into the equation (fourteen in all), five had signs that were counterintuitive, though all had relatively large standard errors: DEPENDTS had a negative coefficient; LABOUR, which was

TABLE 25

The patient load equation (TOTPAT)

		INGPS.	INSPECS	ALLOUT
CONSTANT	(OLS)	−112	756	−36.0
	(2SLS)	−104	735	−46.5
ANESTY	(OLS)		527	1230
			(445)	(370) **
	(2SLS)		572	1236
			(482)	(407) **
AVINC	(OLS)	0.064	0.0033	0.093
		(0.047)	(0.062)	(0.062)
	(2SLS)	0.053	−.011	0.13
CCFP	(OLS)	(0.049)	(.073)	(0.072) *
		260		−106
	(2SLS)	(175)		(222)
		169		−165
COMDOC	(OLS)	(193)	91.7	(247)
			(254)	
	(2SLS)		45.6	
			(283)	
COMPLEX	(OLS)	1211	−750	−951
		(350) (c)	(152) **	(246) **
	(2SLS)	973	−740	−922
		(409) (c)	(157) **	(265) **
CPCTOUT	(OLS)			1.40
				(2.72)
	(2SLS)			1.44
				(3.04)
DEPENDTS	(OLS)	−1.30	−45.9	6.01
		(38.2)	(31.5)	(28.5)
	(2SLS)	−2.67	−44.7	15.7
		(40.3)	(33.3)	(32.1)
EMPAT	(OLS)	0.23	1.56	2.98
		(1.50)	(0.47) **	(0.63) **
	(2SLS)	0.81	1.49	2.88
		(1.99)	(0.49) **	(0.72) **
FULLTIME	(OLS)		−128	321
			(190)	(196)
	(2SLS)		−25.5	300
			(220)	(224)
GROUP	(OLS)	0.83	−0.15	0.62
		(1.30)	(1.34)	(1.21)
	(2SLS)	1.20	0.37	0.25
		(1.58)	(2.16)	(1.40)
LABOUR	(OLS)	0.022	0.034	0.027
		(0.013) *	(0.011) **	(0.0069) **
	(2SLS)	−0.0079	0.033	0.033
		(0.032)	(0.033)	(0.015) *

TABLE 25 Continued

		INGPS.	INSPECS	ALLOUT
MAC	(OLS)	−189	−9.51	−8.32
		(156)	(119)	(97.8)
	(2SLS)	−187	−57.9	−8.75
		(179)	(135)	(105)
MEDICINE	(OLS)		105	360
			(384)	(259)
	(2SLS)		12.1	187
			(406)	(297)
NUMCOMMS	(OLS)	37.5		
		(53.6)		
	(2SLS)	47.3		
		(55.7)		
NUMHOSP	(OLS)		49.8	35.0
			(35.3)	(38.5)
	(2SLS)		47.2	41.5
			(36.7)	(41.9)
OBSGYN	(OLS)		−121	406
			(336)	(274)
	(2SLS)		−199	224
			(356)	(324)
OTHERDOC	(OLS)	−77.2		92.2
		(161)		(132)
	(2SLS)	−75.0		82.4
		(166)		(154)
OVERHEAD	(OLS)	0.012	0.00018	−0.0044
		(0.0070) *	(0.0086)	(0.0043)
	(2SLS)	0.039	0.017	0.0021
		(0.019) *	(0.029)	(0.0080)
PARTTIME	(OLS)	−99.8	−40.2	17.5
		(232)	(148)	(114)
	(2SLS)	−170	−68.5	19.8
		(272)	(156)	(130)
PEDS	(OLS)			777
				(400) *
	(2SLS)			417
				(490)
PRICE	(OLS)			−1.16
				(3.82)
	(2SLS)			−6.12
				(6.79)
PSYCH	(OLS)		−285	127
			(481)	(296)
	(2SLS)		−407	122
			(524)	(319)

TABLE 25 Continued

		INGPS.	INSPECS	ALLOUT
SPECASEX	(OLS)	−174	35.2	−59.9
		(79.5) *	(65.3)	(56.6)
	(2SLS)	−159	26.1	−11.6
		(101)	(69.8)	(69.6)
SPEMP	(OLS)	−123	26.7	118
		(130)	(122)	(106)
	(2SLS)	−143	−27.2	114
		(137)	(138)	(119)
SSR	(OLS)	455	−61.2	−219
		(595)	(330)	(121) *
	(2SLS)	441	−209	−193
		(627)	(369)	(134)
SUBDOC	(OLS)		−167	
			(168)	
	(2SLS)		−103	
			(193)	
SURGERY	(OLS)		305	1045
			(396)	(248) **
	(2SLS)		251	933
			(414)	(272) **
URBAN	(OLS)	9.40	131	−227
		(146)	(250)	(300)
	(2SLS)	−32.9	192	−280
		(153)	(278)	(326)
YRSLCN2	(OLS)	−770	−291	−42.3
		(465) *	(258)	(268)
	(2SLS)	−697	−305	−15.9
		(497)	(270)	(287)
VRSPRAC	(OLS)	5.98	5.68	−17.4
		(17.3)	(16.7)	(19.8)
	(2SLS)	7.23	3.81	−14.9
		(18.3)	(18.7)	(21.5)
VRSPRACSQ	(OLS)	−0.38	−0.30	0.16
		(0.41)	(0.39)	(0.46)
	(2SLS)	−0.52	−0.25	0.11
		(0.45)	(0.41)	(0.50)
R^2	(OLS)	0.37	0.58	0.81
	(2SLS)	0.33	0.55	0.78
$\bar{R}^2$	(OLS)	0.26	0.44	0.71
	(2SLS)	0.22	0.40	0.67
F	(OLS)	3.27 **	4.00 **	7.96 **
	(2SLS)	2.79 **	3.55 **	6.82 **

NOTE: See note to Table 24.

significantly positive in the OLS equation, had a negative coefficient in the two-stage run; the URBAN variable had an unexpected negative effect, as did membership on the Medical Advisory Committee of the affiliated hospital, which we had expected to operate as a quality signal; certification in the College of Family Physicians was accompanied by larger patient loads.

There were several other findings worth nothing. The emulation variable, EMPAT, which we had expected to be influential, was positive but insignificant. Similarly the YRSPRAC and YRSPRACSQ variables had the expected signs (positive and negative respectively), and the competitive effects of other physicians were in the anticipated direction, but all these coefficients were insignificant at the 95 per cent level.

We obtained results closer to expectations for the opted-in specialist equation. The over-all fit was much improved ($\bar{R}^2 = 0.40$), and we found no significant counterintuitive results. In the two-stage equation the complexity variable had the expected negative sign (in contrast to the INGPS finding) and was significant. Furthermore, the emulation variable here became strongly significant. Since the EMPAT variable refers to the average patient load of a physician's peers only for one month (January 1976) whereas TOTPAT measures a five-month patient load, the average value for the former is only about one-quarter as large as the latter (see appendix D). Thus an estimated coefficient of about 4 would be necessary to indicate full compensation by physicians for perceived differences from peer group norms. The observed coefficient of about 1.5 indicates only partial adjustment.

The only other significant coefficient was found in the OLS equation for the LABOUR variable, again with the anticipated positive sign.

In the two-stage equation counterintuitive coefficients were found on DEPENDTS (+), AVINC (−), SPECASEX (+), and MAC (−), but all had relatively large standard errors. In the OLS equation only SPEMP (+) and GROUP (−) had 'wrong' signs. The specialty dummy variables had the expected signs throughout but were in all cases insignificant. Apparently, any significant differences in the practice loads of various specialties are related to intervening variables.

The patient equation for the opted-out regime obtained extraordinarily high $\bar{R}^2$'s (0.71 for the OLS and 0.67 for the two-stage regression); for cross-sectional analysis these results are really quite remarkable. Significantly larger patient loads were experienced by opted-out physicians who lived in rich areas AVINC, were surrounded by peers with large practices EMPAT,[3] and

3 The coefficients indicate an adjustment factor about twice as great as that observed for opted-in specialists, but still somewhat less than full compensation for perceived differences.

were either anaesthetists or surgeons. A complex service mix was accompanied by a smaller practice. In the OLS regression the sample selectivity regressor representing the effects of the unobserved variables in the OPTION equation was significantly negative but insignificant in the two-stage run. In other words the *unobserved* variables which induce physicians to opt out also cause them to have smaller practices.

Counterintuitive coefficients were found for YRSPRAC (−) and YRSPRACSQ (+), SPEMP (+), URBAN (−), OTHERDOC (+), PARTTIME (+), FULLTIME (+), OBSGYN (+), PSYCH (+), and MAC (−). In the OLS equation OVERHEAD also had a 'wrong' negative sign. In no case did a counterintuitive coefficient have a relatively small standard error.

The price variable in the TOPPAT equation has the expected negative coefficient but it is statistically insignificant. Apparently the deterrent effect suggested by our bivariate analysis in chapter 3 cannot be substantiated by these multivariate results. Furthermore, it appears that the nature of the competitive environment, in terms of the proportion of the physician's specialty in the county who have opted out, is in the direction expected but again insignificant. Despite the weakness of these 'economic factors' the explanatory power of the equation as a whole is remarkable.

In summary, there is considerable diversity in the factors which determine patient load across the three regimes. Service complexity and the emulation effect have strong effects in the INSPECS and ALLOUT regimes, but the COMPLEX variable has a counterintuitive sign in the INGPS equation. Aside from these two variables, the remaining effects differ from one regime to another, and one must conclude that the determinants of practice size are not constant across these subsamples.

THE TOTAL BILLINGS EQUATION (TOTDOL)

The regression results for the workload equation TOTDOL were in general very satisfactory (Table 26). The levels of explanation attained in the INGPS and ALLOUT regimes were quite impressive, though the two-stage $\bar{R}^2$ for INSPECS was only 0.16.

In the INGPS regime there are a number of significant coefficients with the 'right' signs: total billings are positively related to the total patient load and practice overhead, and negatively to certification in the College of Family Physicians. In the OLS equation the complexity of the service mix and the number of tests ordered also have significant positive coefficients, and part-time teaching has a negative effect.

The counterintuitive coefficients are ACTBED (−), AVINC (−), and URBAN (−); also in the OLS equation PATWISH is negative, and in the two-stage

TABLE 26

The workload equation (TOTDOL)

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	−10206	−20465	−25388
	(2SLS)	−7599	−18476	−31796
ACTBED	(OLS)	−322	1290	−415
		(350)	(732) *	(1532)
	(2SLS)	−341	1488	−545
		(546)	(997)	(1923)
ANESTY	(OLS)		−5774	2186
			(14460)	(10685)
	(2SLS)		−11010	9510
			(20634)	(14595)
AVINC	(OLS)	−0.95	−0.35	−0.67
		(1.03)	(2.83)	(2.19)
	(2SLS)	−1.25	−0.070	−0.23
		(1.56)	(3.75)	(3.29)
CCFP	(OLS)	−10016		7824
		(3621) **		(7959)
	(2SLS)	−12336		7568
		(5694) *		(10595)
COMPLEX	(OLS)	33349	43788	25069
		(7817) **	(8604) **	(8748)
	(2SLS)	26784	46121	20834
		(16826)	(14619) **	(10911) *
COST	(OLS)	−148	−6466	684
		(2557)	(5200)	(3810)
	(2SLS)	−1622	−6008	664
		(4113)	(6834)	(5629)
DEPENDTS	(OLS)	895	1742	1588
		(768)	(1336)	(877) *
	(2SLS)	914	1826	1871
		(1355)	(1795)	(1096) *
EMBILL	(OLS)	1.96	−2.18	0.15
		(2.55)	(1.83)	(2.63)
	(2SLS)	1.87	−2.46	−0.66
		(4.21)	(2.67)	(3.46)
FULLTIME	(OLS)		−4774	−7668
			(7891)	(6545)
	(2SLS)		−7695	−6283
			(11523)	(8602)
IDEOLOGY	(OLS)			1822
				(3248)
	(2SLS)			1746
				(4116)

TABLE 26 Continued

		INGPS	INSPECS	ALLOUT
LABOUR	(OLS)	0.14	0.25	0.32
		(0.26)	(0.51)	(0.27)
	(2SLS)	−0.43	0.16	0.94
		(0.79)	(1.21)	(0.69)
LESSMRC	(OLS)	−5167	2511	805
		(3759)	(7531)	(4364)
	(2SLS)	−7015	2973	2152
		(6817)	(10771)	(6117)
MEDICINE	(OLS)		2156	21155
			(12002)	(8108) **
	(2SLS)		5326	20591
			(16959)	(10447) *
NUMHOSP	(OLS)	1093	−1051	−1202
		(1188)	(1588)	(1370)
	(2SLS)	1640	−1032	−757
		(1890)	(2146)	(1688)
OBSGYN	(OLS)		7154	25509
			(13439)	(9942) **
	(2SLS)		8590	26282
			(19486)	(13151) *
OVERHEAD	(OLS)	0.40	0.62	0.075
		(0.15) **	(0.39)	(0.16)
	(2SLS)	1.11	0.20	0.053
		(0.51) *	(1.07)	(0.43)
PARTTIME	(OLS)	−8946	614	214
		(5009) *	(6880)	(4099)
	(2SLS)	−11850	380	2414
		(8470)	(9102)	(5334)
PATWISH	(OLS)	−23.9	6640	5551
		(2619)	(5500)	(4230)
	(2SLS)	1656	7305	6092
		(4291)	(7222)	(5268)
PEDS	(OLS)			24936
				(13693) *
	(2SLS)			23640
				(17436)
PSYCH	(OLS)		13575	26336
			(16778)	(8476) **
	(2SLS)		13925	26850
			(24243)	(12994) *
SPEMP	(OLS)	−2802	6247	−163
		(2860)	(5662)	(3544)
	(2SLS)	−3340	7544	−401
		(4334)	(7596)	(4457)

TABLE 26 Continued

		INGPS	INSPECS	ALLOUT
SSR	(OLS)	−2779	10942	2864
		(13887)	(14269)	(4506)
	(2SLS)	−2349	11721	3930
		(22142)	(19245)	(6590)
SURGERY	(OLS)		−4311	19091
			(11027)	(8991) *
	(2SLS)		−4559	24236
			(14406)	(11810) *
TESTS	(OLS)	0.34	0.50	−0.032
		(0.059) **	(0.14) **	(0.084)
	(2SLS)	0.38	0.44	−0.068
		(0.26)	(0.32)	(.18)
TOTPAT	(OLS)	19.4	24.5	22.4
		(2.07) **	(5.50) **	(4.09) **
	(2SLS)	19.7	27.6	16.5
		(7.65) **	(14.7) *	(6.55) **
URBAN	(OLS)	−1927	−2245	11493
		(3162)	(11113)	(14140)
	(2SLS)	−3071	−5226	14201
		(4831)	(15533)	(20506)
R^2	(OLS)	0.81	0.61	0.80
	(2SLS)	0.57	0.35	0.71
$\bar{R}^2$	(OLS)	0.78	0.50	0.71
	(2SLS)	0.50	0.16	0.57
F	(OLS)	25.0 **	5.00 **	7.82 **
	(2SLS)	7.93	1.76	4.94 **

NOTE: See note to Table 24.

equation LABOUR is negative. The relatively large standard errors indicate that these may all have been chance occurrences. The emulation variable EMBILL has the expected sign but is insignificant, a surprising result.

It should also be noted that whereas the $\bar{R}^2$ attained on the two-stage regression is a very respectable 0.50, the $\bar{R}^2$ on the OLS run was 0.78! The use of fitted values for TOTPAT apparently had a great effect in reducing the explanatory power of the equation, and the relatively low $\bar{R}^2$ of 0.45 in the reduced form of TOTPAT (see Table 34) suggests that this loss may be due to the introduction of 'noise' as much as to the elimination of a spurious correlation.

In the INSPECS regime we find again that TOTPAT is a strong explanatory variable, and here COMPLEX is significantly positive in both the OLS and the two-stage estimations. In the OLS equation, ACTBED and TESTS also have posi-

tive and significant effects as expected. In the two-stage estimation the coefficient on ACTBED is insignificant, but again it is positive and large, as might be expected, given the importance of hospital work in specialists' practices.

There are again several counterintuitive results, but all with relatively large standard errors. AVINC enters with a negative sign; EMBILL, very surprisingly, also has a negative coefficient, which is somewhat disconcerting despite its large standard error. 'Wrong' signs were also encountered on LESSMRC (+), NUMHOSP (−), PARTTIME (+), SPEMP (+), SURGERY (−), and URBAN (−). Except for surgery all the specialty dummies had the expected signs, but they were all insignificant! Apparently interspecialty workload differences are not significantly related to the specialties in themselves but to other intervening variables. The policy implications of such a finding are interesting. If further research substantiated the insignificance of these specialty dummy variables in explaining variation in billings, policies designed to equalize gross professional incomes across opted-in specialists through fee schedule restructuring could be called into question. It may in fact be inappropriate to attempt any further interspecialty equalization (excluding general practice) if the important intervening variables differ significantly across specialties.

The workload of opted-out physicians is explained remarkably well by our estimated equations; although the OLS fit ($\bar{R}^2 = 0.71$) is better than that obtained in the two-stage analysis ($\bar{R}^2 = 0.57$), the difference is not as great as was observed in the INGPS regime. This probably reflects the much higher $\bar{R}^2$ in the reduced form equation for the important TOTPAT variable obtained in the ALLOUT regime ($\bar{R}^2$ of 0.85 as against $\bar{R}^2$ of 0.45 for INGPS).

Again, all the significant coefficients are of the expected signs; TOTPAT is once more a driving variable and is joined as a significant determinant by COMPLEX in the two-stage analysis. The number of dependants has the expected positive effect on the level of billings generated. In addition to these three, the other significant variables are specialty dummies: MEDICINE (+), OBSGYN (+), PSYCH (+), SURG (+), and, in the OLS run, PEDS (+). This result is intriguing; although the specialty dummies were insignificant in the INSPECS regime, an opposite result is obtained here. Other things equal, opted-out medical specialists can be expected to have over $20 000 more in billings than their general practitioner counterparts, obstetricians and gynaecologists about $26 000 more than GPs, psychiatrists about the same, and surgeons and paediatricians about $24 000 more than GPs. As noted in chapter 3, however, our workload figures for opted-out general practitioners may be biased downwards, and the deviations measured by the specialty dummies are undoubtedly picking up this effect; there appear to be

no significant interspecialty differences between the opted-out specialists, except perhaps in the case of anaesthetists.

Despite the over-all good fit of the opted-out TOTDOL equation, there were a large number of counterintuitive results, albeit with large standard errors. ACTBED had a negative coefficient, as did AVINC, TESTS, NUMHOSP, and even EMBILL (in the two-stage run); ANESTY, CCFP, COST, IDEOLOGY, LESSMRC, and PARTTIME all had positive coefficients.

In summary, it appears that impressive levels of explanation were attained for the workload equations in the INGPS and ALLOUT regimes. In all three regimes TOTPAT and COMPLEX seem to be the driving variables, but they are joined by a variety of other explanatory variables, different in each regime. Finally, although the emulation effect was powerful in the TOTPAT equation, it was entirely insignificant in explaining workload. It may simply be that the information available to physicians, on which they base their 'conforming' behaviour is better for practice size than volume of billings, though we have no concrete evidence on this point.

THE QUEUE EQUATION (QUEUE)

The levels of explanation for the queue equations in general were unimpressive; only in the ALLOUT regime ($\bar{R}^2 = 0.23$) did we obtain a respectable fit (Table 27). We must simply conclude that the important determinants of waiting times for appointments, whatever they might be, were not included in the equations we specified.[4]

However, several significant results were obtained, different in each regime. In the INGPS equation significant coefficients were found for OVERHEAD and COMPLEX, both with the expected positive sign. In the OLS version we also obtained significant coefficients on SELFREFS, SSR, TOTPAT (all negative). 'Wrong' signs were observed for SPEMP (+), URBAN (+), PARTTIME (−), OTHERDOC (+), and GROUP (+), but all with relatively large standard errors, except for GROUP in the OLS analysis.

In the INSPECS regime only FULLTIME was significant in both the OLS and the two-stage regression with expected positive coefficients. An unexpected positive coefficient was obtained on TOTPAT, but the standard error was relatively small only in the OLS run.

4 Another potential cause of low $\bar{R}^2$'s relates to measurement error in the variables of the model, particularly the dependent variable. The QUEUE data were derived from interviews rather than from the computerized OHIP physician profile and therefore might be more susceptible to the vagaries of recall and biased responses. Similar observations apply to the data on HOURS, LABOUR, OVERHEAD, PRICE, and TESTS.

TABLE 27

The QUEUE equation

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	−5.66	−6.88	10.3
	(2SLS)	−5.62	−6.37	1.92
ACTBED	(OLS)	−0.0099	−0.60	−3.70
		(0.096)	(0.66)	(1.97) *
	(2SLS)	−0.011	−0.78	−3.34
		(0.11)	(0.72)	(1.98) *
ANESTY	(OLS)		−0.89	−3.55
			(12.7)	(13.9)
	(2SLS)		3.48	−1.23
			(13.8)	(16.1)
COMPLEX	(OLS)	12.6	3.08	−1.06
		(2.33) **	(6.74)	(11.4)
	(2SLS)	11.49	1.42	1.10
		(4.09) **	(8.26)	(12.6)
CPCTOUT	(OLS)			0.18
				(0.13)
	(2SLS)			0.19
				(0.13)
DEPENDTS	(OLS)	0.11	−0.97	1.72
		(0.23)	(1.26)	(1.13)
	(2SLS)	0.11	−1.18	1.81
		(0.27)	(1.33)	(1.17)
FULLTIME	(OLS)		15.5	9.87
			(7.28) *	(8.24)
	(2SLS)		16.1	9.06
			(7.87) *	(8.65)
GROUP	(OLS)	0.015	−0.0026	−0.095
		(0.0078) (c)	(0.055)	(0.052) *
	(2SLS)	0.017	−0.039	−0.11
		(0.010)	(0.075)	(0.55) **
LABOUR	(OLS)	0.000058	0.00035	−0.00019
		(0.000073)	(0.00048)	(0.00037)
	(2SLS)	0.0000072	0.0015	0.0000042
		(0.00016)	(0.0010)	(0.00075)
MEDICINE	(OLS)		4.26	0.82
			(10.3)	(8.97)
	(2SLS)		0.93	0.91
			(10.7)	(9.07)
OBSGYN	(OLS)		13.0	10.5
			(11.6)	(10.2)
	(2SLS)		9.76	9.71
			(12.2)	(10.4)

TABLE 27 Continued

		INGPS	INSPECS	ALLOUT
OTHERDOC	(OLS)	0.17		
		(0.97)		
	(2SLS)	0.31		
		(1.12)		
OVERHEAD	(OLS)	0.00015	0.00038	0.00024
		(0.000044) **	(0.00036)	(0.00020)
	(2SLS)	0.00025	0.000064	0.00033
		(0.00012) *	(0.0010)	(0.00032)
PARTTIME	(OLS)	−1.17	3.90	2.32
		(1.39)	(5.87)	(4.49)
	(2SLS)	−1.56	4.14	3.05
		(1.70)	(6.07)	(4.90)
PEDS	(OLS)			8.48
				(13.4)
	(2SLS)			8.17
				(13.4)
PSYCH	(OLS)		23.4	5.58
			(15.3)	(11.9)
	(2SLS)		23.4	7.85
			(16.5)	(13.1)
SELFREF	(OLS)	−0.000088		
		(0.000039) *		
	(2SLS)	−0.000068		
		(0.00013)		
SPEMP	(OLS)	1.23	−3.32	−0.36
		(0.82)	(5.29)	(4.42)
	(2SLS)	1.12	−4.16	−0.98
		(0.95)	(5.78)	(4.42)
SSR	(OLS)	−6.34	−0.059	5.21
		(3.66) *	(12.6)	(5.73)
	(2SLS)	−5.50	0.035	6.02
		(4.55)	(13.3)	(5.91)
SUBDOC	(OLS)		−1.15	−4.63
			(6.82)	(6.28)
	(2SLS)		−2.58	−4.01
			(7.48)	(6.85)
SURGERY	(OLS)		4.97	2.08
			(9.87)	(10.6)
	(2SLS)		4.43	0.082
			(10.2)	(11.7)
TOTPAT	(OLS)	−0.0020	0.0087	0.0062
		(0.00078) **	(0.0046) (c)	(0.0055)
	(2SLS)	−0.0023	0.0059	0.0072
		(0.0020)	(0.0087)	(0.0082)

TABLE 27 Continued

		INGPS	INSPECS	ALLOUT
URBAN	(OLS)	0.94	3.74	6.68
		(0.88)	(9.42)	(14.7)
	(2SLS)	0.76	7.10	4.97
		(1.03)	(10.3)	(14.7)
YRSLOCAL	(OLS)	0.070	−0.15	−0.081
		(0.044)	(0.25)	(0.32)
	(2SLS)	0.067	−0.25	−0.051
		(0.059)	(0.27)	(0.35)
R^2	(OLS)	0.41	0.25	0.41
	(2SLS)	0.23	0.23	0.42
$\bar{R}^2$	(OLS)	0.34	0.08	0.22
	(2SLS)	0.14	0.06	0.23
F	(OLS)	5.59 **	1.40	1.98 *
	(2SLS)	2.42 *	1.27	2.08 **

Additional 'wrong' coefficients were observed for DEPENDTS (−), URBAN (+), YRSLOCAL (−) and, in the two-stage analysis, ANESTY (+).

Even in the OLS version of this equation, we could not explain more than 8 per cent of the total variance with the variables we introduced!

In the ALLOUT regime the results were somewhat better; here an $\bar{R}^2$ of 0.23 was attained in the two-stage run. There were two significant coefficients, on ACTBED and GROUP, both negative. Again there were a number of 'wrong' coefficients on URBAN (+), TOTPAT (+), YRSLOCAL (−), and, in the OLS regression, on LABOUR (−) and COMPLEX (−); all had large standard errors.

THE HOURS OF WORK EQUATION (HOURS)

The most notable feature of the HOURS equations (Table 28) is the very bad fits obtained in all three regimes: the two-stage $\bar{R}^2$'s for the INGPS, INSPECS, and ALLOUT equations are 0.00, 0.03, and 0.04 respectively! With the equations specified we had almost no success in explaining the variation in hours of patient care across practitioners. Particularly surprising is the lack of explanatory power of workload TOTDOL. In the two-stage analysis hours of work are not determined to any significant extent by the amount of work to be done – other variables, presumably unobserved or at least not included in our model, must dominate the determination of hours. It may be that the technical capa-

TABLE 28

The hours of work equation (HOURS)

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	23.5	51.5	15.9
	(2SLS)	24.7	50.9	13.2
ANESTY	(OLS)		−1.89	1.47
			(6.38)	(6.42)
	(2SLS)		−4.98	4.72
			(7.05)	(9.42)
AVINC	(OLS)	0.0011	−0.00065	0.00054
		(0.00080)	(0.0015)	(0.0016)
	(2SLS)	0.0012	0.00019	0.0013
		(0.00088)	(0.0016)	(0.0018)
CCFP	(OLS)	−2.43		5.58
		(3.04)		(6.89)
	(2SLS)	−2.78		8.18
		(3.53)		(7.67)
CHANGHRS	(OLS)	3.25	−2.14	1.42
		(2.85)	(3.99)	(4.17)
	(2SLS)	3.60	−1.93	0.032
		(3.64)	(4.10)	(4.62)
DEPENDTS	(OLS)	0.17	0.41	1.10
		(0.64)	(0.68)	(0.68)
	(2SLS)	0.43	0.45	1.36
		(0.73)	(0.70)	(0.83)
FULLTIME	(OLS)		−8.73	−7.19
			(4.32) *	(5.14)
	(2SLS)		−11.7	−8.30
			(4.81) **	(5.69)
GROUP	(OLS)	−0.0057	0.037	−0.032
		(0.022)	(0.031)	(0.032)
	(2SLS)	−0.0078	0.042	−0.043
		(0.026)	(0.041)	(0.038)
LABOUR	(OLS)	0.00015	0.00032	0.00028
		(0.00020)	(0.00026)	(0.00021)
	(2SLS)	0.000017	−0.000013	0.00019
		(0.00037)	(0.00059)	(0.00047)
MAC	(OLS)	−0.37	2.69	1.87
		(2.77)	(3.16)	(2.75)
	(2SLS)	−0.38	4.29	0.86
		(3.34)	(3.45)	(3.06)
MEDICINE	(OLS)		−3.68	−0.31
			(5.87)	(6.66)
	(2SLS)		−0.68	1.21
			(6.33)	(7.49)

TABLE 28 Continued

		INGPS	INSPECS	ALLOUT
NUMCOMMS	(OLS)	0.36	−0.065	0.88
		(0.94)	(1.37)	(1.23)
	(2SLS)	0.44	−0.18	0.48
		(1.04)	(1.42)	(1.36)
NUMHOSP	(OLS)	2.37	0.16	−0.66
		(0.98) **	(0.81)	(1.06)
	(2SLS)	2.47	0.35	−0.45
		(1.10) *	(0.84)	(1.16)
OBSGYN	(OLS)		−6.16	−0.82
			(6.54)	(5.73)
	(2SLS)		−3.89	2.14
			(6.94)	(6.82)
OVERHEAD	(OLS)	0.00024	−0.00016	0.000058
		(0.00013) *	(0.00021)	(0.00012)
	(2SLS)	0.00036	−0.00035	0.00027
		(0.00043)	(0.00052)	(0.00021)
PARTTIME	(OLS)	−8.99	−0.49	3.01
		(4.14) *	(3.44)	(2.83)
	(2SLS)	−10.2	−0.17	2.87
		(5.20) *	(3.59)	(3.27)
PEDS	(OLS)			5.66
				(8.40)
	(2SLS)			7.87
				(9.45)
PSYCH	(OLS)		1.68	4.24
			(8.90)	(6.16)
	(2SLS)		2.80	2.89
			(9.25)	(8.21)
SPEMP	(OLS)	0.14	−1.28	−3.60
		(2.32)	(2.98)	(2.82)
	(2SLS)	−0.68	0.16	−3.71
		(2.54)	(3.26)	(3.08)
SSR	(OLS)	1.41	1.13	2.99
		(10.1)	(7.40)	(3.27)
	(2SLS)	2.46	4.86	2.08
		(11.2)	(8.08)	(3.81)
SURGERY	(OLS)		−3.30	−8.48
			(5.42)	(5.55)
	(2SLS)		−2.32	−3.46
			(5.66)	(7.80)
TOTDOL	(OLS)	0.00098	0.000068	0.00022
		(0.00040) **	(0.000044)	(0.000084) **
	(2SLS)	0.000025	0.000031	0.000093
		(0.000071)	(0.000081)	(0.00016)

TABLE 28 Continued

		INGPS	INSPECS	ALLOUT
URBAN	(OLS)	−3.42	−8.52	−1.41
		(2.50)	(5.65)	(8.79)
	(2SLS)	−3.32	−11.2	−3.78
		(2.76)	(6.08) *	(9.75)
R^2	(OLS)	0.23	0.26	0.40
	(2SLS)	0.11	0.22	0.29
$\bar{R}^2$	(OLS)	0.13	0.08	0.19
	(2SLS)	0.00	0.03	0.04
F	(OLS)	2.23 *	1.34	1.77 **
	(2SLS)	0.89	1.07	1.09

city to produce services efficiently varies considerably across physicians and that this intrinsic characteristic is the dominant explanatory variable.

In the INGPS equation only two variables had significant coefficients in the two-stage run: NUMHOSP had the expected positive coefficient and PARTTIME the expected negative one. In the OLS estimation two additional variables entered significantly, OVERHEAD and TOTDOL, both with the expected positive coefficients.

In the two-stage run, CCFP (−), LABOUR (+), and NUMCOMMS (+) had unexpected coefficients: these were accompanied by a 'wrong' positive coefficient on SPEMP in the OLS regression. The CHANGHRS variable, presumably indicating a recent major increase in working time for any physician, had the expected positive coefficient, but was insignificant.

In the INSPECS regime the results were equally dismal; only two variables had significant coefficients, URBAN and FULLTIME, both with the expected negative signs.

Counterintuitive coefficients were found in the two-stage run for SPEMP (+), GROUP (+), OVERHEAD (−), MAC (+), PSYCH (+), and CHANGHRS (−!); AVINC (−) and LABOUR (+) had unexpected coefficients in the OLS equation. All these coefficients had large standard errors. All the specialty dummy variables had insignificant coefficients, a result interesting in itself. Apparently there is no evidence that even surgeons, for example, work significantly shorter hours than paediatricians, other things equal.

In the ALLOUT regime there were *no* significant explanatory variables in the two-stage run; TOTDOL had a significant positive coefficient in the OLS regression, but this became an entirely insignificant effect in the unbiased two-stage estimation.

Counterintuitive coefficients were found for LABOUR (+), NUMHOSP (−), PARTTIME (+), NUMCOMMS (+), MAC (+), OBSGYN (+), ANESTY (+), PSYCH (+), MEDICINE (+), and PEDS (+), but again all had large standard errors.

All in all we have done a very poor job of explaining the variation in hours of work, but this negative result itself may have some policy implications. To the extent that working time reflects idiosyncratic features of a physician and his style of practice and cannot be treated as a surrogate for workload (or vice versa), rationalizing fee schedules in terms of their relation to the time requirements of service provision may be groundless. So long as different physicians take different amounts of time to do similar things, remuneration systems can compensate either services or time, but one will not necessarily imply the other.

THE LABOUR AND OVERHEAD EQUATIONS (LABOUR, OVERHEAD)

We shall discuss the results of the LABOUR and OVERHEAD equations together since they jointly represent practice expenses as a whole (Tables 29 and 30). The LABOUR regressions obtained a better fit in general than did the OVERHEAD regressions; in neither case were there any very powerful explanatory equations.

In the INGPS regime TOTDOL had the expected positive effect and was significant in both the LABOUR and OVERHEAD equations. For the OLS estimations LABOUR was significant in the OVERHEAD equation and vice versa, with positive coefficients in each case indicating the dominance of complementarity, but the significance of their relationship disappears in the two-stage estimations. There are some troublesome findings in each equation in terms of counterintuitive coefficients with small standard errors; in the LABOUR equation COMPLEX had a negative coefficient, and PARASUP as well, and in the OVERHEAD equation we found 'wrong' positive coefficients on PARTTIME and on HOURS in the OLS run. These results, as well as the poor fits, suggest an unsuccessful specification of these equations.

In both the LABOUR and the OVERHEAD equations there were other 'wrong' signs, although all had large standard errors. In the former, DEPENDTS (+), ACTBED (+), NUMHOSP (+), URBAN (−), PARTTIME (+), and CCFP (−) were all counterintuitive. The same was true for OTHERDOC (−), HOURS (+), and COMPLEX (−) in the OVERHEAD equation.

We fared a little better in the INSPECS regime. Here the levels of explanation were quite respectable (0.35 and 0.31 for LABOUR and OVERHEAD respectively), and we encountered no counterintuitive coefficients with small standard errors.

TABLE 29

The LABOUR equation

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	4742	1801	10876
	(2SLS)	7408	8392	12349
ACTBED	(OLS)	124	142	122
		(123)	(165)	(754)
	(2SLS)	137	51.0	145
		(150)	(218)	(834)
ANESTY	(OLS)		−3170	−13573
			(3127)	(5213) **
	(2SLS)		−161	−13667
			(3518)	(5723) **
CCPP	(OLS)	−392		−637
		(1387)		(3883)
	(2SLS)	−467		−468
		(1668)		(4605)
COMDOC	(OLS)		−1646	
			(2632)	
	(2SLS)		−2737	
			(2730)	
COMPLEX	(OLS)	−8886	−257	115
		(3201) (c)	(1700)	(3987)
	(2SLS)	−12239	−792	−1037
		(4755) (c)	(2662)	(4500)
DEPENDTS	(OLS)	445	−140	−799
		(284)	(317)	(453) *
	(2SLS)	403	118	−773
		(336)	(342)	(525)
FULLTIME	(OLS)		327	−881
			(1890)	(3122)
	(2SLS)		184	−834
			(2217)	(3581)
GROUP	(OLS)	6.04	29.6	38.7
		(9.93)	(13.6) **	(19.5) *
	(2SLS)	9.24	49.7	36.1
		(11.9)	(15.7) **	(22.7)
HARASS	(OLS)	1677	2451	592
		(1019)	(1294) *	(1652)
	(2SLS)	1748	3400	539
		(1220)	(1869) *	(1878)
HOURS	(OLS)	8.95	37.8	91.6
		(44.1)	(52.1)	(81.7)
	(2SLS)	−65.7	−184	26.0
		(153)	(115)	(177)

TABLE 29 Continued

		INGPS	INSPECS	ALLOUT
MEDICINE	(OLS)		2959	−4769
			(2529)	(3790)
	(2SLS)		2491	−4986
			(2731)	(4197)
NUMHOSP	(OLS)	423	85.4	113
		(451)	(353)	(603)
	(2SLS)	600	192	89.3
		(600)	(375)	(681)
OBSGYN	(OLS)		1754	−3996
			(2826)	(3690)
	(2SLS)		629	−4367
			(2986)	(4214)
OTHERDOC	(OLS)	−565		−1334
		(1263)		(2199)
	(2SLS)	−157		−941
		(1484)		(2486)
OVERHEAD	(OLS)	0.23	0.32	0.17
		(0.053) **	(0.084) **	(0.072) **
	(2SLS)	0.24	0.66	0.11
		(0.17)	(0.18) **	(0.14)
PARASUP	(OLS)	−1042	−799	322
		(641)	(1241)	(1969)
	(2SLS)	−1473	−335	404
		(831) (c)	(1284)	(2380)
PARATEAM	(OLS)	134	−139	−186
		(636)	(1608)	(2175)
	(2SLS)	507	−1109	186
		(782)	(1927)	(2660)
PARTTIME	(OLS)	574	−168	−2745
		(1950)	(1567)	(1740)
	(2SLS)	262	−618	−2827
		(2749)	(1684)	(2012)
PEDS	(OLS)			−5277
				(5278)
	(2SLS)			−5207
				(6161)
PSYCH	(OLS)		−2436	−11978
			(3648)	(3815) **
	(2SLS)		−2332	−11591
			(3780)	(4194) **
SPEMP	(OLS)	384	−223	1765
		(1040)	(1288)	(1824)
	(2SLS)	454	−1503	1346
		(1204)	(1450)	(2111)

TABLE 29 Continued

		INGPS	INSPECS	ALLOUT
SSR	(OLS)	−3548	−442	−3285
		(4656)	(3118)	(2103)
	(2SLS)	−3825	−1990	−3130
		(5386)	(3380)	(2305)
SUBDOC	(OLS)		2027	
			(1816)	
	(2SLS)		5155	
			(2149) **	
SURGERY	(OLS)		793	−6768
			(2424)	(4079)
	(2SLS)		1103	−8017
			(2599)	(4739) *
TOTDOL	(OLS)	0.079	0.023	0.15
		(0.023) **	(0.022)	(0.053) **
	(2SLS)	0.12	−0.0026	0.22
		(0.051) *	(0.070)	(0.084) **
URBAN	(OLS)	−1098	−1408	−2156
		(1116)	(2325)	(5593)
	(2SLS)	−1442	−2830	−2557
		(1387)	(2696)	(6168)
R^2	(OLS)	0.40	0.52	0.59
	(2SLS)	0.25	0.50	0.52
$\bar{R}^2$	(OLS)	0.32	0.38	0.43
	(2SLS)	0.14	0.35	0.33
F	(OLS)	4.40 **	3.59 **	3.47 **
	(2SLS)	2.13 *	3.25 **	2.58 **

In the LABOUR equation, OVERHEAD, SUBDOC, GROUP, and HARASS all had significant positive effects as expected. In the OVERHEAD equation the significant explanatory variables were LABOUR (+), GROUP (−), and, in the OLS estimation, TOTDOL (+). The confirmation of the effects of group membership was particularly noteworthy: positive for LABOUR, negative for OVERHEAD.

Unfortunately, there were a very large number of counterintuitive results in both equations, albeit with large standard errors. In the LABOUR equation DEPENDTS (+), SPEMP (−), FULLTIME (+!), OBSGYN (+), SURGERY (+), NUMHOSP (+), URBAN (−), TOTDOL (−!), COMPLEX (−), PARASUP (−!), and PARATEAM (−!) all had 'wrong' signs. It is particularly surprising to find that full-time teachers did not have lower labour costs than non-academic physicians, that labour costs were negatively associated with workload, and

TABLE 30

The OVERHEAD equation

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	−580	11544	338
		(4888)	(5103) **	(14919)
	(2SLS)	1866	5089	−12092
		(9054)	(8854)	(17175)
ACTBED	(OLS)	−55.8	192	−1542
		(202)	(199)	(1274)
	(2SLS)	−29.4	24.6	−1417
		(245)	(236)	(1281)
ANESTY	(OLS)		−3918	5460
			(3834)	(9507)
	(2SLS)		−3721	3709
			(4330)	(11174)
CCFP	(OLS)	3615		−2965
		(2250)		(6692)
	(2SLS)	3687		−5995
		(2565)		(6968)
COMPLEX	(OLS)	1396	−1322	−8384
		(5156)	(2038)	(6651)
	(2SLS)	−3415	1012	−6878
		(7416)	(3038)	(6799)
DEPENDTS	(OLS)	−139	57.7	377
		(472)	(374)	(797)
	(2SLS)	−61.1	−53.6	−58.6
		(567)	(424)	(906)
FULLTIME	(OLS)		−3177	6240
			(2225)	(5308)
	(2SLS)		−2291	7502
			(2679)	(5401)
GROUP	(OLS)	−20.7	−40.6	39.2
		(16.1)	(16.3) **	(34.5)
	(2SLS)	−17.8	−54.3	39.6
		(18.9)	(20.9) **	(38.6)
HOURS	(OLS)	126	−20.2	68.0
		(69.9)	(64.4)	(141)
	(2SLS)	111	98.3	336
		(221)	(153)	(242)
LABOUR	(OLS)	0.63	0.49	0.56
		(0.14) **	(0.13) **	(0.22) **
	(2SLS)	0.37	0.76	0.58
		(0.28)	(0.25) **	(0.45)
MEDICINE	(OLS)		−552	4924
			(3145)	(6584)
	(2SLS)		−689	2774
			(3461)	(6993)

TABLE 30 Continued

		INGPS	INSPECS	ALLOUT
NUMHOSP	(OLS)	−1022	200	150
		(735)	(432)	(1036)
	(2SLS)	−921	56.0	395
		(934)	(486)	(1050)
OBSGYN	(OLS)		−1479	6846
			(3473)	(6305)
	(2SLS)		−1769	3876
			(3806)	(6781)
OTHERDOC	(OLS)	−776		2228
		(2051)		(3634)
	(2SLS)	−749		2939
		(2372)		(3674)
PARTTIME	(OLS)	6113	1099	−504
		(3145) (c)	(1844)	(2975)
	(2SLS)	6633	1538	−1000
		(3976) (c)	(2031)	(3250)
PEDS	(OLS)			5340
				(9078)
	(2SLS)			1134
				(9641)
PSYCH	(OLS)		1491	13446
			(4468)	(6828) (c)
	(2SLS)		1394	12686
			(4873)	(8077)
SPEMP	(OLS)	830	2028	999
		(1702)	(1554)	(2970)
	(2SLS)	1198	2438	1624
		(1961)	(1789)	(3119)
SSR	(OLS)	−3971	4430	3425
		(7665)	(3743)	(3581)
	(2SLS)	−5443	4719	3276
		(8835)	(4045)	(3762)
SUBDOC	(OLS)		−2605	
			(2123)	
	(2SLS)		−4139	
			(2721)	
SURGERY	(OLS)		−1858	9965
			(2994)	(7053)
	(2SLS)		−2447	6724
			(3208)	(8251)
TOTDOL	(OLS)	0.060	0.049	−0.0010
		(0.037) *	(0.025) *	(0.096)
	(2SLS)	0.12	−0.016	0.047
		(0.069)	(0.068)	(0.16)

TABLE 30 Continued

		INGPS	INSPECS	ALLOUT
URBAN	(OLS)	2099	−1835	8473
		(1791)	(2856)	(9538)
	(2SLS)	1898	−130	7458
		(2109)	(3483)	(9638)
R^2	(OLS)	0.37	0.52	0.36
	(2SLS)	0.18	0.44	0.36
$\overline{R}^2$	(OLS)	0.30	0.41	0.15
	(2SLS)	0.09	0.31	0.15
F	(OLS)	4.68 **	4.46 **	1.61 *
	(2SLS)	1.83 **	3.29 **	1.61 *

that positive attitudes to the use of paraprofessionals were accompanied by lower use of their services. Again, these results suggest a possible misspecification. In the OVERHEAD equation a similar array of 'wrong' signs was revealed: ACTBED (+), NUMHOSP (+), URBAN (−), PARTTIME (+), TOTDOL (−!), HOURS (+), OBSGYN (−), PSYCH (+!), MEDICINE (−), and SUBDOC (−). Again the negative relationship between workload and overhead expenses is surprising, as is the finding that psychiatrists had higher overhead expenses (though not significantly) than paediatricians (the specialty dummies had no significant explanatory power in either area of total practice expenses).

For the ALLOUT regime the LABOUR equation results were much more satisfactory than those obtained in the OVERHEAD equation. Not only was the level of explanation much higher (0.33 versus 0.15) but there were more significant 'right' signs and fewer 'wrong' ones in the LABOUR equation. We found here that PSYCH (−), ANESTY (−), SURGERY (−), and TOTDOL (+) all had the expected effects; they were joined in the OLS run by DEPENDTS (−), OVERHEAD (+), and GROUP (+). The counterintuitive results included MEDICINE (−), PEDS (−), NUMHOSP (+), URBAN (+), HOURS (+), COMPLEX (−), CCFP (−), ACTBED (+), and, in the OLS regression, PARATEAM (−). All had large standard errors.

In the OVERHEAD equation there were no significant variables in the two-stage regression; in the OLS run LABOUR had a significant positive coefficient indicating the expected complementarity effect, but the positive coefficient with a small standard error on the psychiatry dummy defies explanation, though it reinforces the bivariate result found in chapter 3. Whether this reflects very expensive couches, strategic use of tax-deductible expenses, or something else entirely is unclear.

There were numerous counterintuitive results: NUMHOSP (+), GROUP (+), HOURS (+), COMPLEX (−), CCFP (−), FULLTIME (+!), SURGERY (+), and ANESTY (+!). The positive coefficients on FULLTIME and ANESTY are particularly troublesome, though all the standard errors were relatively large.

In summary, what can we learn from these equations? The low explanatory power and the proliferation of counterintuitive results suggest serious misspecification; with regard to an explanation of the use of practice resources, our model seems to be inadequate. On the other hand there were several notable results. We can safely conclude that LABOUR and OVERHEAD are complements rather than substitutes, that workload is an important determinant of practice expenses, and that the specialty effects are insignificant for opted-in physicians.

THE TESTS EQUATION (TESTS)

The results of the regression analyses for the TESTS equations were satisfactory in the INGPS and ALLOUT regimes, but disappointing in the case of INSPECS (Table 31). In each case there were a number of significant explanatory variables; there were also many 'wrong' signs in each regime.

For INGPS, the TOTPAT (+), COMPLEX (+), and YRSPRAC (−) variables were all significant and had the expected effects. LABOUR had a significant positive coefficient but became insignificant in the two-stage run. DEPENDTS had a counterintuitive negative sign in the two-stage regression, with a small standard error; for this no explanation is obvious.

Counterintuitive coefficients with large standard errors were observed for PATWISH (−), URBAN (−), CONS (+), COST (+), and CCFP (−); these were joined in the OLS run by DEPENDTS (−), SPEMP (+), OVERHEAD (−), and GROUP (−).

In the INSPECS regime we found some troublesome results: in the two-stage regression the only variables with relatively small standard errors, OVERHEAD and GROUP, both had unexpected negative coefficients. Again, no obvious explanations are available. In the OLS run TOTPAT (+), MEDICINE (+), and SSR (−) were significant.

'Wrong' signs were also observed for DEPENDTS (−), SPEMP (+), URBAN (−), AVINC (−), PARTTIME (−), FULLTIME (−), CONS (+), COST (+), SURGERY (−), YRSPRAC (+), and, in the OLS run, for LABOUR (−) and GROUP (−). All in all a very unsatisfactory equation.

The ALLOUT regime produced better results – an $\bar{R}^2$ of 0.37 and only one serious counterintuitive coefficient, AVINC (−). Significant coefficients with

TABLE 31

The TESTS equation

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	−44317	−6263	52070
	(2SLS)	−43229	27205	82864
ANESTY	(OLS)		−5588	−10127
			(11325)	(16012)
	(2SLS)		−13306	−8037
			(12320)	(17912)
AVINC	(OLS)	2.56	−0.33	−6.15
		(1.57)	(2.35)	(3.01) (c)
	(2SLS)	1.63	−0.96	−8.16
		(1.59)	(2.65)	(3.27) (c)
CCFP	(OLS)	−2755		31130
		(6056)		(11253) **
	(2SLS)	−8864		31408
		(6305)		(11281) **
COMPLEX	(OLS)	54676	5530	−3983
		(11822) **	(6045)	(12593)
	(2SLS)	42959	4203	−9847
		(12681) **	(7393)	(13294)
CONS	(OLS)	6875	−348	−11737
		(7000)	(6442)	(5237) *
	(2SLS)	10366	4993	−10500
		(7699)	(6930)	(5293) *
COST	(OLS)	5829	3277	6992
		(4201)	(4013)	(5736)
	(2SLS)	2899	5317	2575
		(4292)	(4175)	(6607)
DEPENDTS	(OLS)	−1978	−370	292
		(1283)	(1153)	(1337)
	(2SLS)	−3105	−214	106
		(1311) (c)	(1248)	(1346)
FULLTIME	(OLS)		1733	−8054
			(6750)	(9798)
	(2SLS)		−3884	−1402
			(7222)	(10421)
GROUP	(OLS)	−29.4	−42.7	59.9
		(43.1)	(51.3)	(58.5)
	(2SLS)	0.70	−144	95.8
		(46.9)	(75.5) (c)	(62.6)
LABOUR	(OLS)	0.75	−0.21	0.51
		(0.41) *	(0.44)	(0.42)
	(2SLS)	0.46	1.17	0.75
		(0.79)	(1.10)	(0.80)

TABLE 31 Continued

		INGPS	INSPECS	ALLOUT
MEDICINE	(OLS)		16226	12412
			(9177) *	(10900)
	(2SLS)		14545	16425
			(10003)	(11361)
OBSGYN	(OLS)		−4169	9155
			(10205)	(10871)
	(2SLS)		−8407	12480
			(11235)	(11154)
OVERHEAD	(OLS)	−0.062	0.44	−0.085
		(0.25)	(0.32)	(0.24)
	(2SLS)	1.22	−1.76	−0.70
		(0.77)	(0.92) (c)	(0.44)
PARTTIME	(OLS)	8458	−6017	−5387
		(7602)	(5405)	(5164)
	(2SLS)	5218	−2837	−5591
		(8104)	(5651)	(5462)
PATWISH	(OLS)	−7089	3751	−1508
		(4318)	(4460)	(6509)
	(2SLS)	−3771	4392	974
		(4481)	(4683)	(6648)
PEDS	(OLS)			−4126
				(15150)
	(2SLS)			2598
				(15656)
PSYCH	(OLS)		−17311	−10266
			(13960)	(13311)
	(2SLS)		−15738	−7938
			(15308)	(14881)
SPEMP	(OLS)	1314	−799	4214
		(4651)	(4618)	(5210)
	(2SLS)	−412	3535	3964
		(4662)	(4957)	(5384)
SSR	(OLS)	11505	−31013	−3247
		(21379)	(12103) **	(6715)
	(2SLS)	20355	−18382	−2294
		(21879)	(13029)	(6989)
SURGERY	(OLS)		−2209	−7020
			(8746)	(11586)
	(2SLS)		−7249	584
			(9251)	(12327)
TOTPAT	(OLS)	12.7	8.25	1.06
		(3.25) **	(4.00) *	(5.97)
	(2SLS)	17.4	7.19	−1.56
		(6.46) **	(7.73)	(8.29)

TABLE 31 Continued

		INGPS	INSPECS	ALLOUT
URBAN	(OLS)	−1104	−6915	31887
		(4959)	(9203)	(15547) *
	(2SLS)	−2127	−7712	37428
		(4931)	(10443)	(15909) *
YRSPRAC	(OLS)	−325	132	28.5
		(185) *	(198)	(297)
	(2SLS)	−398	31.4	−150
		(216) *	(233)	(323)
R^2	(OLS)	0.46	0.35	0.54
	(2SLS)	0.48	0.32	0.54
$\bar{R}^2$	(OLS)	0.39	0.18	0.37
	(2SLS)	0.41	0.14	0.37
F	(OLS)	5.88 **	1.96 *	2.93 **
	(2SLS)	6.44 **	1.69	2.94 **

expected signs were found for URBAN (+), CONS (−), and CCFP (+). 'Wrong' signs were found for SPEMP (+), OVERHEAD (−), PARTTIME (−), FULLTIME (−), COST (+), TOTPAT (−), COMPLEX (−), OBSGYN (+), PEDS (+), and, in the OLS equation, for YRSPRAC (+) and PATWISH (−). We note that different significant variables appear in each of the three regimes.

THE REFERRAL EQUATION (REFS)

The results on the REFS equation were quite satisfactory (Table 32); reasonably good fits were obtained for INGPS ($\bar{R}^2 = 0.32$) and ALLOUT ($\bar{R}^2 = 0.55$), and even in the INSPECS regime, the level of explanation was passable ($\bar{R}^2 = 0.20$). Unfortunately the soundness of our specification is thrown open to question by the large number of counterintuitive results, some of them with small standard errors.

In the INGPS regime we found significant and expected coefficients on CCFP (−), TOTPAT (+), and EMREFS (+). The sample selectivity regressor was also a significant variable with a negative impact – the unobserved determinants of the option decision had a negative impact on the rate of referral – i.e. whatever led physicians to opt out (not included in our option equation) also caused them to restrict referrals, and vice versa. There was a counterintuitive positive coefficient on LABOUR, with a small standard error, in the OLS run.

TABLE 32

The referrals equation (REFS)

		INGPS	INSPECS	ALLOUT
CONSTANT	(OLS)	−414	−1205	4200
	(2SLS)	−318	225	4884
ANESTY	(OLS)		−631	605
			(1503)	(1533)
	(2SLS)		−1279	−375
			(1701)	(1915)
AVINC	(OLS)	−0.31	0.11	0.095
		(0.22)	(0.26)	(0.27)
	(2SLS)	−0.36	0.11	0.15
		(0.27)	(0.28)	(0.33)
CCFP	(OLS)	−1802		1393
		(673) **		(1054)
	(2SLS)	−2141		1445
		(854) **		(1201)
COMPLEX	(OLS)	−1839	−659	−2183
		(1365)	(668)	(1234) *
	(2SLS)	−3007	−785	−1829
		(1887)	(835)	(1507)
CONS	(OLS)	46.0	−134	−1336
		(784)	(697)	(526) **
	(2SLS)	164	38.6	−1428
		(1006)	(721)	(607) *
COST	(OLS)	324	726	−191
		(472)	(431) (c)	(514)
	(2SLS)	159	810	106
		(586)	(442) (c)	(644)
CPCTOUT	(OLS)			−28.6
				(13.3) *
	(2SLS)			−34.0
				(15.8) *
DEPENDTS	(OLS)	7.90	−1.83	−281
		(140)	(121)	(127) *
	(2SLS)	−23.9	−19.6	−336
		(171)	(130)	(150) *
EMREFS	(OLS)	9.92	6.46	0.73
		(2.63) **	(3.29) *	(0.15) **
	(2SLS)	9.52	5.43	0.79
		(3.26) **	(3.48)	(0.19) **
FULLTIME	(OLS)		−85.7	−1103
			(688)	(958)
	(2SLS)		−500	−1549
			(773)	(1177)

TABLE 32 Continued

		INGPS	INSPECS	ALLOUT
HARASS	(OLS)	465	51.2	−543
		(500)	(403)	(484)
	(2SLS)	621	23.8	−436
		(628)	(560)	(567)
LABOUR	(OLS)	0.11	0.036	0.13
		(0.046) (c)	(0.048)	(0.039) (c)
	(2SLS)	0.058	0.072	0.038
		(0.11)	(0.12)	(0.086)
LIBERAL	(OLS)	257	212	−1211
		(507)	(496)	(581) *
	(2SLS)	452	359	−1275
		(619)	(514)	(664)
MEDICINE	(OLS)		−673	−583
			(1076)	(1053)
	(2SLS)		−660	−1059
			(1089)	(1261)
MIXGROUP	(OLS)	−1152	531	−143
		(837)	(820)	(1186)
	(2SLS)	−723	248	−170
		(1077)	(1052)	(1349)
NUMHOSP	(OLS)	189		
		(223)		
	(2SLS)	199		
		(268)		
OBSGYN	(OLS)		413	408
			(1223)	(1156)
	(2SLS)		213	369
			(1280)	(1339)
OTHERDOC	(OLS)	−161		−582
		(617)		(616)
	(2SLS)	−12.1		−789
		(740)		(730)
OVERHEAD	(OLS)	−0.044	−0.0034	−0.0039
		(0.027)	(0.034)	(0.022)
	(2SLS)	−0.020	−0.085	0.036
		(0.086)	(0.083)	(0.046)
PARTTIME	(OLS)	−491	−187	−694
		(930)	(609)	(505)
	(2SLS)	−401	−100	−863
		(1155)	(619)	(602)
PATWISH	(OLS)	−548	196	486
		(476)	(470)	(614)
	(2SLS)	−433	264	363
		(586)	(479)	(712)

TABLE 32 Continued

		INGPS	INSPECS	ALLOUT
PEDS	(OLS)			171
				(1461)
	(2SLS)			−248
				(1711)
PSYCH	(OLS)		−1626	−677
			(1868)	(1262)
	(2SLS)		−1864	−1683
			(1974)	(1647)
SPEMP	(OLS)	686	61.6	−1000
		(521)	(503)	(509) (c)
	(2SLS)	651	188	−850
		(625)	(520)	(593)
SSR	(OLS)	−4715	−1348	−6.85
		(2430) *	(1426)	(640)
	(2SLS)	−4974	−908	−354
		(2960) *	(1487)	(771)
SUBDOC	(OLS)		−49.0	
			(668)	
	(2SLS)		−373	
			(753)	
SURGERY	(OLS)		−1052	−76.2
			(1056)	(1155)
	(2SLS)		−1281	−420
			(1082)	(1383)
TOTPAT	(OLS)	2.67	0.44	0.19
		(0.36) **	(0.45)	(0.56)
	(2SLS)	3.48	0.38	0.32
		(0.84) **	(0.89)	(0.89)
URBAN	(OLS)	546	662	1058
		(566)	(1003)	(1479)
	(2SLS)	519	579	946
		(669)	(1076)	(1698)
R^2	(OLS)	0.58	0.40	0.76
	(2SLS)	0.42	0.39	0.69
$\overline{R}^2$	(OLS)	0.51	0.22	0.65
	(2SLS)	0.32	0.20	0.55
F	(OLS)	7.53 **	2.05 *	6.42 **
	(2SLS)	3.93 **	1.97 *	4.52 **

'Wrong' coefficients with large standard errors were found on AVINC (−), PARTTIME (−), LIBERAL (+), CONS (+), COST (+), MIXGROUP (−), PATWISH (−), and, in the OLS run, on DEPENDTS (+).

In the INSPECS regime the only variable in the two-stage analysis with a small standard error, COST, had an unexpected positive sign. Apparently those physicians who indicated a concern for medical costs in making treatment decisions referred even *more* than those who did not claim to be so influenced, a very curious result. In the OLS run the emulation variable had the expected positive coefficient, but its significance disappeared in the two-stage analysis.

There were relatively few 'wrong' signs in this regime: LABOUR (+), PARTTIME (−), LIBERAL (+), CONS (+), and FULLTIME (−).

The ALLOUT REFS equation had numerous significant coefficients. Although DEPENDTS had the expected negative effect (through greater financial need), the coefficients on SPEMP and LABOUR in the OLS runs were unexpected; their standard errors, however, were relatively large in the two-stage analyses. Other significant explanatory variables with expected signs included LIBERAL (−), CONS (−), EMREFS (+), CPCTOUT (−), and, in the OLS run, COMPLEX (−).

Counterintuitive coefficients appeared on OVERHEAD (+), PARTTIME (−), COST (+), HARASS (−), MIXGROUP (−), and FULLTIME (−).

The emulation variable was important in all three regimes, but curiously the coefficients differ markedly from one regime to another. In the INGPS and INSPECS equations the coefficients on the EMREFS variable (9.52 and 5.43 respectively) indicated full and half compensation for perceived differences in referring patterns[5]; in the ALLOUT regime the reaction was minimal, though significant.

THE SELF-REFERRAL EQUATION (SELFREFS)

The self-referral equation produced fairly satisfactory results: the level of explanation was 0.30, and there was only one serious counterintuitive coefficient (Table 33).

In terms of significant explanatory variables a positive coefficient was observed for TOTDOL and negative coefficients for LABOUR and REFS, all as expected. Counterintuitive coefficients were observed for OTHERDOC (−), PARTTIME (+), HARASS (−), PATWISH (+), HOURS (−), and CCFP (+), all with large standard errors. The negative coefficient on the QUEUE variable in the OLS run was unexpected and worrisome given its relatively small standard error.

5 The REFS variable was a nine-month total, but the EMREFS was for January 1976 only. A coefficient of 9 on the EMREFS variable would therefore indicate full compensation for perceived differences.

TABLE 33

The self-referrals and price equations (SELFREFS and PRICE)

		SELFREFS INGPS	PRICE ALLOUT
CONSTANT	(OLS)	−3588	82.6
	(2SLS)	4876	86.2
ANESTY	(OLS)		−20.0
			(7.47) **
	(2SLS)		−16.5
			(9.10) *
AVINC	(OLS)	1.108	0.0028
		(0.884)	(0.0016) *
	(2SLS)	1.084	0.0022
		(0.988)	(0.0019)
CCFP	(OLS)	4859	−19.3
		(3366)	(7.37) (c)
	(2SLS)	2309	−21.6
		(4465)	(8.03) (c)
COST	(OLS)		1.17
			(3.11)
	(2SLS)		−0.58
			(3.98)
CPCTOUT	(OLS)		0.0064
			(0.082)
	(2SLS)		0.0074
			(0.082)
DEPENDTS	(OLS)		0.42
			(0.78)
	(2SLS)		0.48
			(0.80)
FULLTIME	(OLS)		2.91
			(5.85)
	(2SLS)		4.75
			(6.42)
GROUP	(OLS)		0.087
			(0.037) *
	(2SLS)		0.087
			(0.039) *
HARASS	(OLS)	−1856	
		(2639)	
	(2SLS)	−2523	
		(3238)	
HOURS	(OLS)	15.1	
		(105)	
	(2SLS)	−108	
		(303)	

TABLE 33 Continued

		SELFREFS INGPS	PRICE ALLOUT
IDEOLOGY	(OLS)		−5.47
			(2.99) *
	(2SLS)		−6.72
			(3.51) *
LABOUR	(OLS)	−0.127	0.00026
		(0.224)	(0.00021)
	(2SLS)	−0.610	0.00061
		(0.399)	(0.00052)
LESSMRC	(OLS)		−2.83
			(3.26)
	(2SLS)		−1.99
			(3.47)
LIBERAL	(OLS)		−12.0
			(3.58) **
	(2SLS)		−12.2
			(3.66) **
MAC	(OLS)		3.20
			(3.20)
	(2SLS)		4.13
			(3.44)
MEDICINE	(OLS)		−24.2
			(7.23) **
	(2SLS)		−23.3
			(7.40) **
MIXGROUP	(OLS)		11.4
			(7.31)
	(2SLS)		13.1
			(7.66) *
NUMCOMMS	(OLS)		1.69
			(1.38)
	(2SLS)		1.84
			(1.40)
OBSGYN	(OLS)		−21.5
			(7.49) **
	(2SLS)		−21.6
			(7.66) **
OTHERDOC	(OLS)	−107	
		(3189)	
	(2SLS)	−1200	
		(3494)	
OVERHEAD	(OLS)	−0.122	−0.000032
		(0.147)	(0.00014)
	(2SLS)	−0.181	−0.00022
		(0.514)	(0.00032)

TABLE 33 Continued

		SELFREFS INGPS	PRICE ALLOUT
PARTTIME	(OLS)	287	−2.10
		(4637)	(3.23)
	(2SLS)	1167	−1.03
		(5960)	(3.54)
PATWISH	(OLS)	1518	
		(2355)	
	(2SLS)	2686	
		(2590)	
PEDS	(OLS)		−45.6
			(11.6) **
	(2SLS)		−43.5
			(12.4) **
PSYCH	(OLS)		0.91
			(7.72)
	(2SLS)		5.03
			(9.51)
QUEUE	(OLS)	−493	
		(2541) (c)	
	(2SLS)	702	
		(583)	
REFS	(OLS)	−0.716	
		(0.441)	
	(2SLS)	−0.9060	
		(1.036)	
SPECASEX	(OLS)		6.43
			(1.52) **
	(2SLS)		6.70
			(1.61) **
SPEMP	(OLS)		4.85
			(3.34)
	(2SLS)		4.29
			(3.48)
SSR	(OLS)	−13113	2.50
		(11636)	(4.08)
	(2SLS)	−16483	3.98
		(12332)	(4.55)
SUBDOC	(OLS)		2.51
			(4.24)
	(2SLS)		4.68
			(5.16)
SURGERY	(OLS)		−14.3
			(5.53) **
	(2SLS)		−13.5
			(5.69) **

TABLE 33 Continued

		SELFREFS INGPS	PRICE ALLOUT
TOTDOL	(OLS)	0.344	
		(0.548) **	
	(2SLS)	0.389	
		(0.0979) **	
URBAN	(OLS)	2530	
		(2794)	
	(2SLS)	1802	
		(3539)	
YRSLOCAL	(OLS)	−173	−0.21
		(226)	(0.21)
	(2SLS)	−90.0	−0.26
		(305)	(0.22)
YRSPRAC	(OLS)	−118	
		(177)	
	(2SLS)	−232	
		(264)	
R^2	(OLS)	.41	0.72
	(2SLS)	.32	0.72
$\bar{R}^2$	(OLS)	.33	0.59
	(2SLS)	.23	0.59
F	(OLS)	5.38 **	5.19 **
	(2SLS	3.63 **	5.17 **

THE PRICE EQUATION

The level of explanation of opted-out physicians' prices was very good: an $\bar{R}^2$ of 0.59 was attained in both the OLS and the two-stage regressions. Furthermore, the specification of the equation seems sound: twelve of the variables had significant coefficients. An ideological motivation for opting out was associated with lower prices, as indicated by our analysis in chapter three; similarly, physicians who espoused a liberal ideology, indicating more progressive attitudes to the delivery of health services, had lower prices. Members of group practices charged relatively high prices, as did members of mixed-specialty groups, and, as expected, the latter's prices were considerably higher than the former's (about 12 per cent higher). Physicians with specialized age-sex practices also had relatively high prices. The anticipated positive effect of average income was significant only in the OLS regression.

The effects of the specialty dummies were, for the most part, significant and as expected: OBSGYN, SURGERY, MEDICINE, PEDS, and ANESTY all had

TABLE 34

Reduced forms R^2

	INGPS	INSPECS	ALLOUT
TOTDOL	0.61	0.40	0.77
TOTPAT	0.45	0.62	0.85
QUEUE	0.35	0.52	0.69
HOURS	0.20	0.44	0.48
TESTS	0.57	0.53	0.66
REFS	0.46	0.56	0.73
LABOUR	0.42	0.56	0.62
OVERHEAD	0.28	0.51	0.59
SELFREFS	0.45		
PRICE			0.76

significant negative coefficients, with lower prices observed for paediatricians and medical specialists than for the others. PSYCH had an insignificant positive coefficient. The only serious 'wrong' sign was found in the case of CCFP: contrary to expectations, certificants of the College of Family Physicians charged significantly lower prices than non-certified opted-out general practitioners.

A number of other counterintuitive coefficients were observed in the PRICE equation: OVERHEAD (−), PARTTIME (−), YRSLOCAL (−), SPEMP (+), SUBDOC (+), LESSMRC (−), and, in the OLS run, COST (+). All had relatively large standard errors.

There are several other points worth noting. Although neither coefficient was significant, it is surprising that opted-out physicians with full-time teaching appointments had relatively high prices and part-time teachers relatively low ones; an opposite finding would have been more plausible. Contrary to the results of the bivariate analysis in chapter 3, there appeared to be no significant effect of CPCTOUT on PRICE once other variables were taken into account. Similarly, YRSPRAC and YRSLOCAL no longer had any significant effects.

SUMMARY OF THE THREE-REGIME ANALYSIS

We can summarize the results of our multivariate analysis by reference to Table 35. Here we present the significant explanatory variables in each estimated equation, along with the $\bar{R}^2$, which gives an indication of how good a 'fit' was obtained, or in other words, how well the estimated equation 'explains' the observed behaviour.

TABLE 35

Significant explanatory variables by equation

		INGPS	$\bar{R}^2$	INSPECS	$\bar{R}^2$	ALLOUT	$\bar{R}^2$
TOTPAT	OLS	LABOUR (+), OVERHEAD (+), SPECASEX (-), YRSLOCAL (-)	0.26	COMPLEX (-), EMPAT (+), LABOUR (+)	0.44	ANESTY (+), COMPLEX (-), EMPAT (+), LABOUR (+), PEDS (+), SSR (-), SURGERY (+)	0.71
	2SLS	OVERHEAD (+)	0.22	COMPLEX (-), EMPAT (+)	0.40	ANESTY (+), AVINC (+), COMPLEX (-), EMPAT (+), LABOUR (+), SURGERY (+)	0.67
TOTDOL	OLS	CCFP (-), COMPLEX (+), OVERHEAD (+), PARTTIME (-), TESTS (+), TOTPAT (+)	0.78	ACTBED (+), COMPLEX (+), TESTS (+), TOTPAT (+)	0.50	DEPENDTS (+), MEDICINE (+), OBSGYN (+), PEDS (+), PSYCH (+), SURGERY (+), TOTPAT (+)	0.71
	2SLS	CCFP (-), OVERHEAD (+), TOTPAT (+)	0.50	COMPLEX (+), TOTPAT (+)	0.16	COMPLEX (+), DEPENDTS (+), MEDICINE (+), OBSGYN (+), PSYCH (+), SURGERY (+), TOTPAT (+)	0.57
QUEUE	OLS	COMPLEX (+), OVERHEAD (+), SELFREF (-), SSR (-), TOTPAT (-)	0.34	FULLTIME (+)	0.08	ACTBED (-), GROUP (-)	0.22
	2SLS	COMPLEX (+), OVERHEAD (+)	0.14	FULLTIME (+)	0.06	ACTBED (-), GROUP (-)	0.23
HOURS	OLS	NUMHOSP (+), PARTTIME (-), TOTDOL (+)	0.13	FULLTIME (-)	0.08	TOTDOL (+)	0.19
	2SLS	NUMHOSP (+), PARTTIME (-)	0.00	FULLTIME (-), URBAN (-)	0.03		0.04

TABLE 35 Continued

		INGPS	$\bar{R}^2$	INSPECS	$\bar{R}^2$	ALLOUT	$\bar{R}^2$
LABOUR	OLS	OVERHEAD (+), TOTDOL (+)	0.32	GROUP (+), HARASS (+), OVERHEAD (+)	0.38	ANESTY (–), DEPENDTS (–), GROUP (+), OVERHEAD (+), PSYCH (–), TOTDOL (+)	0.43
	2SLS	TOTDOL (+)	0.14	GROUP (+), HARASS (+), OVERHEAD (+), SUBDOC (+)	0.35	ANESTY (–), PSYCH (–), SURGERY (–), TOTDOL (+)	0.33
OVERHEAD	OLS	LABOUR (+), TOTDOL (+)	0.30	GROUP (–), LABOUR (+), TOTDOL (+)	0.41	LABOUR (+)	0.15
	2SLS	TOTDOL (+)	0.09	GROUP (–), LABOUR (+)	0.31		0.15
TESTS	OLS	COMPLEX (+), LABOUR (+), TOTPAT (+), YRSPRAC (–)	0.39	MEDICINE (+), SSR (–), TOTPAT (+)	0.18	CCFP (+), CONS (–), URBAN (+)	0.37
	2SLS	COMPLEX (+), TOTPAT (+), YRSPRAC (–)	0.41		0.14	CCFP (+), CONS (–), URBAN (+)	0.37
REFS	OLS	CCFP (–), EMREFS (+), SSR (–), TOTPAT (+)	0.51	EMREFS (+)	0.22	COMPLEX (–), CONS (–), CPCTOUT (–), DEPENDTS (–), EMREFS (+), LIBERAL (–)	0.65
	2SLS	CCFP (–), EMREFS (+), SSR (–), TOTPAT (+)	0.32		0.20	CONS (–), CPCTOUT (–), DEPENDTS (–), EMREFS (+), LIBERAL (–)	0.55
SELFREFS	OLS	TOTDOL (+)	0.33				
	2SLS	TOTDOL (+)	0.23				

TABLE 35 Continued

		INGPS	$\bar{R}^2$	INSPECS	$\bar{R}^2$	ALLOUT	$\bar{R}^2$
PRICE	OLS					ANESTY (–), AVINC (+), GROUP (+), IDEOLOGY (–), LIBERAL (–), MEDICINE (–), OBSGYN (–), PEDS (–), SPECASEX (+), SURGERY (–)	0.59
	2SLS					ANESTY (–), GROUP (+), IDEOLOGY (–), LIBERAL (–), MEDICINE (–), MIXGROUP (+), OBSGYN (–), PEDS (–), SPECASEX (+), SURGERY (–)	0.59

OPTION: CPCTOUT (+), DEPENDTS (+), GRADSCH (+), LESSMRC (+), LIBERAL (–), MEDICINE (+), PARTTIME (+), RELPOV (–), URBAN (+), YRSLOCAL (+)

The estimation of the OPTION equation was very successful; since the equation was estimated using probit analysis, the R^2 statistic is not available as a measure of goodness of fit, but the estimated equation was significant at the 99 per cent level. Moreover, there were a large number of significant variables with expected signs, the most powerful of which was CPCTOUT, reflecting local peer group trends in opting out.

In the total patient load equation we observe that a number of variables were significant explanatory factors across the different regimes. In particular LABOUR, COMPLEX, and EMPAT all had the expected influence on TOTPAT, though the latter was insignificant in the INGPS regime. The level of explanation was mediocre for INGPS and outstanding for ALLOUT, with the INSPECS result in between.

The levels of explanation for the workload equations were most impressive. It appears that we captured most of the 'driving' variables in our specification at least for INGPS and ALLOUT. The consistently significant explanatory factors were COMPLEX, TESTS, and TOTPAT.

In the QUEUE equation the results were more disappointing. The $\bar{R}^2$'s were in general quite low, and the significant explanatory variables were different in each regime.

The results for the HOURS equation were equally unimpressive. The levels of explanation were the lowest we obtained for any set of equations, and the only consistent explanatory factor was TOTDOL in the OLS estimations of the INGPS and ALLOUT equations. Paradoxically, we did a very good job of 'explaining' workload defined in terms of billings but a very bad one defined in terms of hours of work, even with billings as an explanatory variable! Apparently, the pace of servicing is much more idiosyncratic than is commonly imagined.

The LABOUR equation produced fairly satisfactory results. The $\bar{R}^2$'s were not high but certainly acceptable for a cross-sectional analysis. The consistently significant explanatory variables were GROUP, OVERHEAD, and TOTDOL.

In the OVERHEAD equation the results were somewhat less powerful, especially in the ALLOUT regime. The complementary effect of LABOUR seemed to be the only consistent factor across the three regimes.

The TESTS equation also produced mediocre results. The $\bar{R}^2$'s for INGPS and ALLOUT were acceptable, but the INSPECS result was disappointing. Furthermore, only TOTPAT appeared as a significant explanatory variable in more than one equation.

The results for the referrals equations were more encouraging. The emulation variable EMREFS was a driving force throughout, and the levels of explanation were quite impressive, especially in the ALLOUT regime.

The 'poor quality of care' equation SELFREFS produced unimpressive results.

Finally, the PRICE equation produced probably the best results of any regression. The level of explanation was high, and there were a host of explanatory variables with significant expected effects.

In general, we can fairly say that the results of our multivariate analyses were satisfactory. High levels of explanation were achieved for some key dependent variables; option, patient load, workload, referrals, and price. Over-all, we obtained better fits for the ALLOUT regime than for either of the other two; apparently our specifications picked up more of the significant factors influencing the behaviour of opted-out physicians than was the case for their opted-in counterparts. Finally segmenting the analysis into three separate systems uncovered some diversity in the explanatory variables with significant effects in each regime. The different patterns of practice behaviour in each of these three regimes suggest that they merit separate consideration.

Furthermore, the major conclusions of chapter 3 are supported by the multivariate analysis. The ideological variables are significant determinants of the option and pricing decisions. Peer group variables again appear important: CPCTOUT is a powerful determinant of the option decision (but not of any behavioural decisions with the exception of referral patterns); and the emulation variables are powerful in explaining both patient loads and referrals. Finally, the multivariate analysis has reduced the apparent explanatory power of specialty group. Once other variables are included, specialty itself appears to make little difference to practice behaviour.

AN ALTERNATIVE APPROACH

This chapter has so far not addressed differences between opted-in and opted-out physicians. Rather, it has been concerned with the determinants of the option decision itself and practice behaviour within the three regimes of opted-in general practitioners, opted-in specialists, and all opted-out physicians. The determinants of practice behaviour did differ across regimes.

However, the estimation of the three separate multivariate regimes does not explicitly address the issue of differences between opted-in and opted-out physicians in terms of their practice behaviour. Indeed, the different specifications of each equation across the three regimes preclude direct inferences respecting statistical differences between them. Had the specifications been identical, or at least substantially similar, one could have pro-

ceeded to test differences between regimes using an F-test applied to the different sum of squared residuals emerging from separate regimes and a pooled regression. In this case, we could obtain a measure of the extent to which option status affects practice behaviour.

An alternative and more straightforward approach to the same issue involves estimation of a pooled regression, combining the samples of opted-in and opted-out physicians (for general practitioners and specialists separately), and including in each equation an OPTION dummy variable that takes a value of 1 for opted-outs. This approach was originally precluded because of our concern that the error terms of the 'switching' option equation and the error terms of the various practice behaviour equations in each regime might be correlated. In that case the coefficient on a OPTION dummy variable in a pooled regression would not be unbiased. To take account of this potential correlation of error terms the sample selectivity regressors were generated and introduced into each behavioural equation. However, the almost complete lack of significance of the SSRs throughout the three regimes makes us much more sanguine about pursuing the simple dummy variable route to the estimation of the effects of option status on practice behaviour.

Accordingly, two more sets of equations were run, one for general practitioners and another for specialists, with the inclusion in each equation of an OPTION dummy variable. The specifications of these equations were drawn from those discussed above for the three regimes: the general practitioners' specifications represent an amalgam of those of INGPS and ALLOUT, while the specialists' equation specifications combine INSPECS and ALLOUT.

It remained, however, to specify the hypotheses regarding the effect of option status on the various aspects of practice behaviour. To some extent we could draw on the bivariate results of chapter 3, but we noted there the extent to which intervening variables might be obscuring the effect of option, and in fact this constituted the main rationale for the multivariate analysis of chapter 5. We were guided, then, as much by theoretical considerations as by the suggestions of descriptive statistics in generating the following hypotheses.

We expected option to have a negative effect on patient load, a positive effect on total billings (given patient load), a positive effect on QUEUE (the descriptive statistics of chapter 3 suggest that the market power attributes of opted-out physicians allow them to dispense with the 'practice amenity' aspects of a short queue), a negative effect on hours worked, a positive effect on practice expenses, both LABOUR and OVERHEAD (costs of direct billing), a negative effect on TESTS as suggested by the bivariate results, a negative

TABLE 36

Significant explanatory variables by equation for general practitioners and specialists

		GP'S	$\bar{R}^2$	SPECS	$\bar{R}^2$
TOTPAT	OLS	LABOUR (+), OPTION (–), SPECASEX (–), YRSLOCAL (–)	0.29	ANESTY (+), COMPLEX (–), EMPAT (+), LABOUR (+), NUMHOSP (+)	0.62
	2SLS	OVERHEAD (+), SPECASEX (–), YRSLOCAL (–), YRSPRACSQ (–)	0.24	ANESTY (+), COMPLEX (–), EMPAT (+), LABOUR (+), NUMHOSP (+)	0.56
TOTDOL	OLS	COMPLEX (+), OVERHEAD (+), TESTS (+), TOTPAT (+)	0.73	ACTBED (+), ANESTY (–), COMPLEX (+), OVERHEAD (+), TESTS (+), TOTPAT (+)	0.54
	2SLS	CCFP (–), COMPLEX (+), OVERHEAD (+), TOTPAT (+)	0.44	COMPLEX (+), TOTPAT (+)	0.26
QUEUE	OLS	COMPLEX (+), OVERHEAD (+), TOTPAT (–), YRSLOCAL (+)	0.29	FULLTIME (+)	0.14
	2SLS	COMPLEX (+), TOTPAT (–), YRSLOCAL (+)	0.21	FULLTIME (+), OBSGYN (+)	0.14
HOURS	OLS	NUMHOSP (+), TOTDOL (+) URBAN (–)	0.13	FULLTIME (–), MEDICINE (–), OBSGYN (–), SURGERY (–), TOTDOL (+)	0.12
	2SLS	NUMHOSP (+), URBAN (–)	0.05	FULLTIME (–), MEDICINE (–), OBSGYN (–), SURGERY	0.04
LABOUR	OLS	GROUP (+), HARASS (+), OPTION (+), OVERHEAD (+), TOTDOL (+)	0.33	ANESTY (–), OVERHEAD (+), PSYCH (–), TOTDOL (+)	0.42
	2SLS	OPTION (+), TOTDOL (+)	0.10		0.30

TABLE 36 Continued

		GP'S	$\bar{R}^2$	SPECS	$\bar{R}^2$
OVERHEAD	OLS	HOURS (+), LABOUR (+), NUMHOSP (–)	0.27	LABOUR (+), TOTDOL (+)	0.26
	2SLS	NUMHOSP (–)	0.09		0.12
TESTS	OLS	COMPLEX (+), LABOUR (+), PARTTIME (+), TOTPAT (+)	0.31	MEDICINE (+)	0.17
	2SLS	COMPLEX (+), TOTPAT (+)	0.30	MEDICINE (+)	0.16
REFS	OLS	EMREFS (+), TOTPAT (+)	0.46	ANESTY (–), COMPLEX (–), EMREFS (+), MEDICINE (–), PSYCH (–), SURGERY (–)	0.35
	2SLS	CCFP (–), COMPLEX (–), EMREFS (+), TOTPAT (+)	0.30	COMPLEX (–), EMREFS (+), MEDICINE (–)	0.39
SELFREFS	OLS	TOTDOL (+)	0.27		
	2SLS	TOTDOL (+)	0.16		

effect on referrals (because of the risk of losing scarce patients), and a negative effect on patient self-referral, in recognition of the putative superior quality of care offered by opted-out physicians.

The results of our statistical estimations are summarized in Table 36 (the complete results of these regressions are available to interested readers on application to the Ontario Economic Council). In addition, the effects of option status are presented in Table 37 as the coefficients on the OPTION dummy variable in each equation. The results presented in Table 36 are reminiscent of those appearing in Table 35.

This is hardly surprising, since the specifications of the equations are very similar, and the samples overlap considerably (general practitioners are composed of INGPS and the general practitioners in the ALLOUT sample; SPECS are composed of INSPECS and the specialists in the ALLOUT sample). Nonetheless, it is encouraging that the driving variables in the various equations appear to be the same; the results are robust across slightly different specifications and samples.

The most notable result that emerges from Table 37 is that, although it appeared from the previous estimation of the three regimes as though the practice behaviour of opted-out physicians might differ from that of their opted-in counterparts (at least the significant *determinants* of practice behaviour differed across the regimes), the statistical test of the impact of option status as such yielded only two significant results!

Other things equal, opted-out general practitioners had smaller patient loads (although this result was significant only in the OLS run) and larger expenses on labour resources. *There were no significant effects of option on other aspects of general practitioners' practice behaviour or on any aspect of specialists' practice behaviour*. On the other hand most of the *directions* of the option effects were as predicted; the exceptions are the OLS runs for TOTDOL and REFS, both regimes, and OVERHEAD and SELFREFS in the general practitioner equations, and in the two-stage results, TOTDOL for specialists and TESTS and REFS for general practitioners. Only the last has an unexpected sign on a coefficient that is large relative to its standard error.

One can fairly conclude from these results that, contrary to our initial impressions, option status as such does not seem to have much impact on practice behaviour. Its impact, then, is directly financial in terms of direct charges to patients; we have adduced no evidence that these charges enable opted-out physicians generally to offer a different style of service or quality of care.

There is one further phenomenon associated with opting out which we investigated. We noted in chapter 3 and again in our discussion of the

TABLE 37

Option effects

		GPS	SPECS
TOTPAT	OLS	−433	−97.0
		(278) *	(99.4)
	2SLS	−351	−101
		(289)	(108)
TOTDOL	OLS	−3442	−3772
		(3992)	(3213)
	2SLS	277	−5054
		(6596)	(4501)
QUEUE	OLS	0.756	0.701
		(1.43)	(3.59)
	2SLS	0.402	1.33
		(1.69)	(3.87)
HOURS	OLS	−1.70	−0.248
		(2.92)	(1.89)
	2SLS	−2.70	−0.372
		(3.15)	(2.20)
LABOUR	OLS	3844	1155
		(1436) **	(911)
	2SLS	4398	1349
		(1901) **	(1140)
OVERHEAD	OLS	−711	2415
		(2221)	(1466)
	2SLS	1707	2617
		(2743)	(1789)
TESTS	OLS	−1077	−1048
		(7006)	(3174)
	2SLS	2860	−2144
		(7833)	(3476)
REFS	OLS	757	192
		(745)	(352)
	2SLS	1473	−22.6
		(984) (c)	(375)
SELFREFS	OLS	255	
		(4000)	
	2SLS	−3139	
		(4945)	

TABLE 38

Significant explanatory variables

	GP'S in high-opting-out counties	$\bar{R}^2$	GP's in low-opting-out counties	$\bar{R}^2$	SPECS in high-opting-out counties	$\bar{R}^2$	SPECS in low-opting-out counties	$\bar{R}^2$
TOTPAT	YRSLOCAL (–), OPTION (–)	0.28	GROUP (+), LABOUR (+), YRSLOCAL (–)	0.36	COMPLEX (–), CPCTOUT (+), EMPAT (+), LABOUR (+), NUMHOSP (+), PSYCH (–)	0.63	COMPLEX (–), EMPAT (+), LABOUR (+). YRSLOCAL (–)	0.50
TOTDOL	COMPLEX (+), TESTS (+), TOTPAT (+)	0.84	OVERHEAD (+), TOTPAT (+)	0.59	ANESTY (–), COMPLEX (+), FULLTIME (–), OVERHEAD (+), TESTS (+), TOTPAT (+)	0.39	ACTBED (+), COMPLEX (+), PSYCH (+), TESTS (+), TOTPAT (+)	0.70
QUEUE	COMPLEX (+), OVERHEAD (+), TOTPAT (–)	0.28	COMPLEX (+), YRSLOCAL (+)	0.24	DEPENDTS (+), FULLTIME (+)	0.20	COMPLEX (+), FULL-TIME (+), OBSGYN (+), OPTION (–)	0.18
HOURS		0.09	AVINC (+), PARTTIME (–) TOTDOL (+), URBAN (–)	0.30	DEPENDTS (+), TOTDOL (+)	0.10	FULLTIME (–), MEDI-CINE (–), OBSGYN (–) SURGERY (–)	0.17
LABOUR	TOTDOL (+), OPTION (+)	0.21	OVERHEAD (+), TOTDOL (+)	0.39	ANESTY (–), NUMHOSP (–), OVERHEAD (+), PSYCH (–)	0.35	ANESTY (–), GROUP (+) OVERHEAD (+), TOTDOL (+)	0.40
OVERHEAD	LABOUR (+)	0.18	GROUP (–), LABOUR (+)	0.33	LABOUR (+), OPTION (+)	0.16	GROUP (–), LABOUR (+) TOTDOL (+)	0.41
TESTS	COMPLEX (+), PARTTIME (+), SPEMP (–), TOTPAT (+)	0.56	LABOUR (+)	0.12		0.20	MEDICINE (+)	
REFS	CCFP (–), TOTPAT (+)	0.36	EMREFS (+), NUMHOSP (+) SPEMP (+), TOTPAT (+)	0.58	CPCTOUT (–), EMREFS (+), HARASS (+), LIBERAL (–)	0.64	EMREFS (+), OPTION (+)	0.33
SELFREFS		0.65	OVERHEAD (–)	0.29				

TABLE 39

F-statistics on difference in practice behaviour between high- and low-Opting-Out Areas

	GPS	SPECS
TOTPAT	1.37	0.58
TOTDOL	2.77 **	1.03
QUEUE	1.38	1.27
HOURS	1.77 *	0.95
LABOUR	1.06	1.03
OVERHEAD	0.95	0.81
TESTS	1.55	1.20
REFS	1.27	2.24 **
SELFREFS	1.63 *	

NOTE: The *F*-statistic is computed as:

$$F - [SSR_p - (SSR_h + SSR_1)] / [\text{d.f.p.} - (\text{d.f.h.} + \text{d.f.1.})] / (SSR_h + SSR_1) / (\text{d.f.h.} + \text{d.f.1.}),$$

where SSR_p is the sum of squared residuals in the pooled regression, SSR_h is the sum of squared residuals in the high-opting out sample regression, SSR_1 is the sum of squared residuals in the low-opting-out sample regression, d.f.p. is the residual degrees of freedom in the pooled regression, d.f.h. is the residual degrees of freedom in the high-opting-out sample regression, and d.f.1. is the residual degrees of freedom in the low-opting-out sample regression.

OPTION equation the clustering effect associated with opting out. Physicians tend to opt out in groups defined by specialty and region. What could not be determined, however, from our previous analyses was whether physicians practising in areas of high opting out behaved differently from those in low opting-out areas. Accordingly, we segmented each of our general practitioner and specialist samples into two parts: those practising in areas where the opting-out rate was higher than average, and those practising where it was lower than average.[6] We then estimated separate sets of practice behaviour equations on each of the four samples. The significant explanatory variables in these estimations are presented in Table 38. Of particular note is the fact that opted-out general practitioners had significantly smaller patient loads than did their opted-in counterparts only in the high-opting-out area (the negative coefficient in the low-opting-out area was not significant at the 95 per cent level).

6 In the case of general practitioners the cutoff point was 6 per cent of the general practitioners in the county; for specialists it was 18 per cent.

We also tested for statistically significant differences in the practice behaviour of physicians in the high and low areas by comparing the sum of squared residuals in the two separate regressions with that of the pooled regression, run previously. The *F*-statistics computed in this context represent the magnitude of the difference in the over-all determinants of practice behaviour described by each equation; these are presented in Table 39. It can be seen that practice behaviour in general did not differ very much between the high- and low-opting-out areas. For general practitioners a significant difference was observed only for workload, hours of work, and patient self-referrals; for specialists only the referrals equation was significantly different in the two areas. These results indicate that while there is some effect of local opting-out rates on practice behaviour, especially in the case of general practitioners, the over-all impact is not dramatic.

6
Conclusions

RESULTS OF THE STUDY

Until July 1978 opted-out physicians were a fairly stable proportion of all physicians in Ontario. The opted-out medical population was composed largely of physicians who had chosen to bill patients direct for one of two primary reasons: either as an ideological commitment or in order to maintain discretion over the prices they could charge. We suspect, although we cannot prove it, that most members of the opted-out population made their choices in 1972, when they were required to choose between full participation in the plan and direct patient billing and that opted-out physicians remained a fairly stable cohort (and therefore a declining proportion of the medical population as a whole) until 1978. For the most part new entrants into the profession chose to opt into OHIP.

In most cases the fee structures of opted-out physicians were price-discriminatory; that is, they were linked to the patient's ability to pay, with wealthier patients generally facing higher prices than poorer ones. On average, the fees of opted-out physicians exceeded not only the OHIP benefit but also the OMA fee schedule at the time (1976). Fee levels varied considerably, however, being higher in some specialties than in others, and higher among those who opted out for financial reasons than among those who were ideologically motivated. Again we suspect, although we cannot demonstrate it, that physicians who opted out for financial reasons did so in 1972 to preserve fee structures which they had maintained in their practices (with incremental increases) before and during medicare.

When physicians chose to opt out for ideological or for financial reasons, but particularly in the latter case, they did so in 'clusters.' Opting out was concentrated in particular localities and, within those localities, in particular specialties as well.

Since July 1978, for reasons outlined in chapter 1, the opting-out rate has escalated sharply, and the pattern of opting out has continued to show geographic and specialty concentrations. On the basis of our study, what can we say about the likely effects of such an escalation?

There is little doubt that the opted-out medical population has in the past differed markedly from the opted-in population. The opted-out segment has been, in the first place, much more heavily composed of specialists. It has also been much more heavily composed of physicians with academic appointments – nearly half of the opted-out population, on our estimate, had such appointments at the time of our survey. Whether because of increased market power associated with teaching status or because of the favoured position of academic physicians in OHIP regulations regarding direct billing in special circumstances by opted-out physicians, the connection between teaching status and opting out is striking and cannot be ignored in any attempt to understand opting-out behaviour. In addition, opted-out physicians have been in general more conservative or individualistic in their attitudes; and, as we saw in chapter 5, ideological factors have been somewhat more significant in influencing their practice behaviour than is the case for opted-in physicians. Finally, opted-out physicians have tended to cluster together and to be located in higher-income counties.

There have also been marked differences in the practice profiles of opted-out and opted-in physicians. But because practice profiles vary considerably across specialties it is best to consider these differences by specialty group. As we saw in chapter 3 the average levels of services provided, working hours, and incomes of opted-out and opted-in physicians showed marked differences in some specialty groups. The most central of these differences concerned the size of patient loads: in general practice and the medical specialties patient loads of opted-out physicians were on average smaller than those of opted-in physicians. The difference between the patient loads of opted-out and opted-in psychiatrists suggested by our data was marked but not statistically significant. There is some evidence for both these groups that the smaller patient loads received different kinds of service: dollars-per-patient ratios were higher among opted-out physicians in these specialties than among their opted-in counterparts; opted-out general practitioners and psychiatrists had practices that were more age-sex specialized than did their opted-in peers; and rates of testing and referral did not (with one exception[1]) differ significantly, despite smaller patient loads. Even with this more inten-

1 In the case of general practice the ratio of a physician's referrals to the average for general practitioners in his county was significantly lower for opted-out than for opted-in physicians.

sive servicing, opted-out general practitioners appear to have suffered in income terms from their choice of option, although they gained in leisure. Opted-out medical specialists suffered in both income and leisure terms; and opted-out psychiatrists gained in leisure without a loss of net income.

In the other specialties – surgery, obstetrics and gynaecology, and anaesthesia, groups which constituted about half of the opted-out population – very few differences emerged, on average, in practice characteristics between opted-out and opted-in physicians.

The effects of opting out, then, appear to vary considerably across specialty groups. In some cases there are marked differences in the practice behaviour of opted-out and opted-in physicians; in other cases the two types are very similar. Even where we observe differences, however, it is difficult to know whether to attribute them to option status alone or to differences in the academic, geographic, and ideological complexion of the opted-in and opted-out populations. Furthermore, as the opting-out rate increases we can expect these differences in complexion to be muted. Newly opted-out physicians are being drawn from the ranks of traditionally opted-in physicians and can therefore be expected to resemble them more closely than did long-standing members of the opted-out cohort. The important consideration for predictive purposes is what difference opting out makes by itself. If physicians who are now opted in exercise their prerogative to opt out of OHIP, what effects can we expect this switch to have on the conduct of their practices? Our study did not address explicitly the effects of a *change* in option status. Nonetheless, the regression results presented in chapter 5 are useful in analysing differences in the practice behaviour of opted-in and opted-out physicians, all other things equal.

These results indicate that the findings of our earlier analysis need to be qualified. When we looked at the effect of option status while taking other factors into account, we saw that opting out appeared to affect practice behaviour only in very limited ways and limited circumstances. Opted-out general practitioners again appeared to have smaller patient loads than their opted-in peers, other things equal, particularly in areas where the opting-out rate among general practitioners was relatively high. The effects of these smaller patient loads then reverberated through their practices. However, there was no evidence that the choice of option had substantial effects other than on patient load, no evidence that, for example, opted-out general practitioners spent more time with their patients or offered a different volume or mix of services than did opted-in general practitioners with similar workloads. There were some indications that opted-out general practitioners had larger practice expenses on labour, but aside from this the impact of option on factors other than patient load was minimal.

As for specialists, the impact of the option on practice behaviour appeared to be even smaller. In high-opting-out areas,[2] opted-out specialists had significantly higher practice expenses than those opted in, though unlike to opted-out general practitioners the extra expenses were experienced in non-labour practice overhead. Again, although our earlier analysis had suggested a difference in the pattern of services offered by opted-out and opted-in physicians in certain specialties, the regression results indicated no differences attributable to option status once other factors were taken into account.

In general, we can conclude that in some opted-out general practices the charging of a direct price for medical care has resulted in smaller patient loads. In some opted-out specialty practices on the other hand these prices may in effect have bought improved service amenities such as office accoutrements. Over-all, however, opting out does not seem in itself to have made much difference to medical practice behaviour. Our hypothesis that physicians opted out to substitute price for volume instruments – to see fewer patients at less hurried rates and to generate fewer discretionary services – has not been borne out.

It is often claimed that the patients of opted-out physicians receive more time from their doctors. Our evidence suggests that this may be true only of general practitioners, who comprise about one-quarter of all opted-out physicians, because of their smaller patient loads. But for the rest, the large majority of opted-out physicians, the primary effect of opting out is a financial one, presenting patients with direct charges for medical care; there is little evidence of an effect on medical practice behaviour itself.

RECENT DEVELOPMENTS

The conclusions drawn thus far from our study afford some insight into recent developments. Since the time of our study (and more specifically since mid-1978), a new cohort of physicians has joined the opted-out population, and there have been two significant policy changes. Let us consider first the possible implications of the withdrawal by a substantial number of physicians from the plan. In particular let us consider the possibility that the style of opted-in practice has changed and recent entrants to the opted-out population have sought to escape an increasingly unpleasant practice style.

2 Even though the provincial opting-out rate is now considerably higher than it was at the time of our survey, opting out is essentially a *local* phenomenon generally affecting fairly narrowly defined geographical areas. Extrapolation from our data to the present situation is made easier by the fact that we tended to focus on counties in which opting-out rates were high.

It may be that between 1971 and 1976 opted-in physicians were able to earn satisfactory incomes. Although constrained by a fixed fee schedule and held to fairly low rates of increase, they were able to increase their rates of servicing. Such a strategy of utilization growth, however, cannot be pursued indefinitely.

It is plausible that by 1978 the cumulative increases in services provided per physician were beginning to compromise the quality of care. The marginal negative effect on quality of care, or at least on physician and patient satisfaction, is likely to increase as the rate of servicing increases. By 1976 this process may have been under way; by 1978 its full effects may have reached the average practitioner. Unlike their predecessors, physicians who have opted out since mid-1978 may well have been seeking to substitute price for volume. All this is somewhat speculative, but it does indicate the importance of considering possible differences in the composition and behaviour of the new groups of opted-out physicians.

There have been two major policy changes since the period covered by our survey: the divorce of OMA fee schedule increases from increases in the OHIP schedule of benefits with the lifting of anti-inflation controls, and the regulatory change allowing opted-out physicians associated with medical groups in clinical departments of public hospitals to bill on an opted-in basis through those groups.

As noted above, the major effect of opting out is its financial effect on patients. It is difficult to estimate the extent to which prices to patients have increased with the recent increase in the OMA schedule discussed in chapter 1. At the time of our study the average prices of opted-out physicians were slightly above the OMA rate. The OMA schedule averaged 111.1 per cent of the OHIP benefit, while the prices of opted-out physicians averaged 116.4 per cent of the OHIP benefit. In some specialties average prices were considerably higher: in psychiatry, for example, they averaged 135.5 per cent of the OHIP benefit. The OMA fee schedule has now overtaken and surpassed prices charged by opted-out physicians at the time of our survey. At writing, OMA rates are, on average, 143 per cent of the OHIP rates. Furthermore, it is likely that new entrants to the opted-out segment have opted out in order to avail themselves of a price instrument (whether or not they choose to substitute it for volume). It is virtually certain that the average prices of opted-out physicians are now more than 116 per cent of the OHIP rate. Whether they have escalated to the level of the current OMA schedule, or beyond, is a matter of conjecture. In any event, what we have identified as the main public policy problem raised by opting out – its financial effects on patients – can only have been exacerbated by the increase in the OMA schedule. With that

increase, the lifting of anti-inflation controls, and an improvement in the competitive position of opted-out physicians as more opted-in physicians join their ranks, there may well be enhanced income advantages to opting out in the future and hence increased incentives to do so.

The other major policy change since 1976, this one on the part of government, may in the long run have even more perverse effects. Allowing physicians to engage in a new form of 'practice-streaming' – billing on an opted-in basis at OHIP rates in hospital-based practices and on an opted-out basis at higher rates in private practices – may mean that opting out will affect not only financial access to care but practice behaviour itself. We were not able to investigate the effects of such a provision on the subpopulation of opted-out physicians to whom it applied at the time of our study, that is, opted-out physicians with appointments to teaching hospitals. Such an investigation would have been complicated by the effects of a teaching appointment itself on practice behaviour. We do not know, then, whether such a provision encourages different modes of practice behaviour in hospital-based, as opposed to private, practices, whether it threatens to result in a system of differential treatment of patients according to their ability to pay. This issue, however, merits close attention in the future. The spectre of a two-tiered medical care system with private office-based practices and direct charges for wealthier patients, and hospital 'clinic' practice for poorer ones harks back distressingly to a previous era in Canadian medicine and strikes at the very core of the national medicare system.

POLICY OPTIONS

What, finally, is to be done? The provincial government is faced with a range of policy choices. The most drastic in the short run would be effectively to abolish opting out by refusing to reimburse patients of opted-out physicians. Such a policy already prevails in Quebec and Newfoundland. Special circumstances in those provinces, however, make a non-opting-out policy easier to implement than would be the case in Ontario. Medical incomes in Newfoundland, earned entirely within the plan, are among the highest in Canada, and the economic climate in that province is not favourable to opting out. Quebec physicians are not as mobile as Ontario physicians – they are less likely to leave the province – but Ontario risks losing physicians by closing the 'safety valve' of the optional methods of billing. Furthermore, such a move would cause great political controversy: while favoured by organized labour and by one of the opposition parties, it has been denounced by the current minister of health as tantamount to 'civil conscription.'

However, a modified version of this policy remains worthy of consideration. Throughout this study we have noted that quantitative significance of the academic physicians – particularly part-time appointees to medical faculties – within the opted-out population. Undoubtedly part of the explanation of this phenomenon lies in the greater market power of academic physicians. But it is also true that until recently academic physicians have had a greater incentive to opt out: a privileged exemption from the practice-streaming rule, which allowed them to bill on an opted-out basis in private practices and on an opted-in basis as members of teaching-hospital-based groups. The purpose of this rule may paradoxically have been to increase the availability of services provided on an opted-in basis in teaching hospitals. It may have been seen as allowing teaching hospitals to recruit physicians of their choice, in or out of the plan, while also allowing those hospitals to require that services provided in teaching hospital clinics be billed on an opted-in basis.[3] Without this exemption, a teaching-hospital-based group offering services on an opted-in basis would have had to require all its members to opt into the plan for all of their practice. In the case of part-time teaching physicians, this may have been judged inappropriate. The nominal stipends paid to part-time teachers hardly compensate them for the time spent in teaching and research, and it may have been decided to allow opting out in private practice as an additional source of income for such teachers.

In fact, this regulation apparently encouraged, or at any rate accommodated, high opting-out rates among teaching physicians. Private patients of opted-out teachers have in effect been subsidizing medical education; and students have been presented with a disproportionate number of opted-out physicians as models for emulation. Surely a more reasonable approach to the underpayment of part-time teachers, as teachers, is to increase their stipends directly and not to transfer costs to their private patients. More generally, one might argue that the payment of academic physicians should be entirely contained within the public health and education system. Academic physicians are heavily subsidized in the conduct of their practices not only through the expensive facilities made available to them at the teaching hospitals but also through their use of interns and residents in providing patient care. Moreover, the models presented by teaching physicians to their students should perhaps accord as much as possible with the publicly endorsed styles of practice.

3 A similar rationale may have underlain the exemption of opted-out physicians from the practice-streaming rule while providing service in emergency departments of public general hospitals. Such a provision allowed emergency departments to recruit from all members of the hospital medical staff, opted in or out, in filling their duty rosters, while still ensuring that emergency services were provided on an opted-in basis.

It therefore seems advisable to remove the exemption of members of teaching-hospital-based medical groups from the practice-streaming rule (in effect, to require that they opt in) and at the same time to increase their university stipends substantially. Possibly some physicians would choose on this basis to relinquish their academic appointments; more likely the advantages of such appointments – access to the facilities of medical schools, contact with academic peers, and the opportunity for teaching and research, together with an increased stipend – would outweigh the advantages of opting out.

At the institutional level the process of negotiating and implementing such a change in policy – recognizing, for example, the differing roles, responsibilities, and interests of teaching hospital departments on the one hand and their counterparts within medical faculties on the other – would not be simple. Complexity, however, is nothing new in the remuneration of academic physicians!

If the exemption of academic physicians from the practice-streaming rule were removed, the exemption for members of medical groups in public hospitals would become harder to sustain. The minister of health, after all, has argued that the regulatory change extending the exemption to members of such groups simply removed the disparity between teaching and non-teaching hospitals. As part of an accommodation reached by the Ontario Medical Association, the Ontario Hospital Association, and the Ministry of Health (attempting to guarantee access to hospital-based medical services at OHIP rates – see chapter 1) the exemption of members of public-hospital-based groups may, despite its very recent revival, be harder to dislodge than the academic exemption. A resolution of the financial issues – notably the size of increases in the OHIP schedule of payments to physicians – which led to the recent opting-out 'crisis' may be necessary first.

In raising the issue of the rate of OHIP remuneration of physicians, we are considering financial transfers of a much larger scale than those involved in the remuneration of clinical teachers, but the concerns are analogous. They revolve around social judgments that the costs of medical care, like the costs of education, should not be borne by private individuals. Opting-out transfers the costs of medical care in part from the public sector to individual patients, and as argued in chapter 1 in so doing it threatens the universality of health insurance in the province. It is necessary to look for policies which will ensure that these costs are borne by the public sector, while providing some levers for their control. One policy which bears consideration in this light – a substantial increase in the OHIP schedule of payments to physicians, tied to utilization increases – was recently endorsed by the Select Committee

on Health Care Financing and Costs of the Ontario Legislature. Their recommendation bears repeating here:

> The Committee concludes that a policy of 'cost containment' in the medical care sector which relies mainly on restricting the level of fees is unsound; it leads either to revolving-door practices with the concomitant dilution in the level of care, or to opting-out, with the resulting transfer of costs (*not* containment) from the public to the private purse. The Committee urges the government to reconsider its policy with respect to the OHIP schedule of benefits. In particular, it commends to the attention of the government a system of negotiating fees and utilization rates concurrently so as better to promote the two objectives of quality care and cost containment without economically penalizing medical practitioners. If, for example, the government were to negotiate a multi-year agreement with the profession, incorporating a substantial increase in fees in exchange for a commitment to hold constant the level of utilization (decelerate the 'revolving-doors'), both these objectives could be achieved. To ensure cost containment, the fee increases for subsequent years could be made contingent on the utilization performance in the first year. Such a scheme has now been successfully and (amicably) negotiated in Quebec, and seems to be working very well on the basis of early anecdotal reports. It appears that such a scheme could address the legitimate concerns of the medical profession over the level of fees, as well as the need for responsible cost-control by the government. If so, the vexing trends in medical practice and in opting-out might be reversed, or at least mitigated.

The appropriate level of physician incomes is essentially a social judgment, one regarding which we have little to offer. Our point here is that the relationships between medical fees, the utilization of medical services, and medical incomes are not simple. Controlling only one of these variables does not allow for control of the others. In particular, there is no indication from our data that higher fees in themselves result in decreased rates or different patterns of utilization by encouraging physicians to substitute price for volume instruments. Fee increases must be linked to utilization controls if over-all expenditures are to be controlled.

It is somewhat difficult to predict how a policy of fee increases linked to utilization controls might affect opting-out rates. Physicians who have traditionally opted out would not be likely to change their status. If our speculations about the motivations of recently opted-out physicians are well founded, however, this group can be expected to be more responsive to the opportunity to substitute price for volume *within* the plan. Once presented with a higher OHIP schedule, then, they might be expected to opt back in, and opting-out rates could accordingly return to traditional levels.

SUMMARY

Opting out does constitute a threat to the universality of the health insurance system. It erects financial barriers to care while having little effect on practice behaviour itself. There are a few indications in our data that patients of opted-out physicians enjoy certain benefits associated with being members of small patient loads or certain amenities such as office accoutrements. Such differences in the past have been few and limited to particular circumstances. Nonetheless, slight differences in practice behaviour may presage the development of a two-tiered medical system, particularly in view of the recent regulatory change allowing physicians to maintain both opted-in hospital clinic practices and opted-out private practices.

At present, however, opting out is largely a financial phenomenon and demands essentially financial responses. We have suggested two of these. One would increase the public subsidization of teachers of medicine while requiring that they be opted into OHIP, in effect transferring to the public sector the costs now being borne, inappropriately, by private patients of academic physicians. The other would substantially increase the schedule of OHIP payments to physicians while tying further increases to demonstrated restraint of utilization.

On most comparative measures the costs of medical care in Ontario are not 'too high.' The challenge raised by opting out is to ensure that these costs are not distributed between the private and the public sectors in a way which threatens the universality of government health insurance or distorts patterns of practice. The major problem posed by opting out now is that it erects financial barriers to care. It must be brought under control before these barriers become even higher and wider, and before they come to divide medical practice in this province into two very different worlds.

APPENDIX A

Survey methodology

SURVEY DESIGN

The rather complex model of physician behaviour presented in the text implies an accordingly complex research methodology. One source of the necessary data in which we are interested is the OHIP physician profile system. As described in appendix C, this system contains information on a wide range of variables for each physician who submits claims to the plan, including certain biographical characteristics, such as the physician's date and place of graduation, specialty, and option type; service volumes by fee schedule code item; the number of referrals made and (to a limited extent) the number of lab and X-ray tests ordered; the number of patients seen over given time periods; and the age-sex distribution of patients.

Our model, however, suggests that a much wider range of physician, practice and community characteristics are needed to understand physician practice behaviour. We require, for example, information about a physician's hours of work, the labour and capital resources of his practice, the prices he charges, and his attitudes towards his practice, his patients, and his peers as well as towards the network of governmental and professional policy within which he operates. Much of this information is available only from the physician himself, and to collect it a survey was required. Any combining of survey and profile information of this sort, however, would raise problems of confidentiality. In order to conduct the merge operation ourselves, we would have had to identify individual respondents; and given the confidential nature of the information involved it was essential that respondents remain anonymous. We therefore designed our survey in such a way that the data on each individual physician was merged by the physician himself.

Each physician in our sample was contacted by a letter outlining the survey and asking for his co-operation. The letter was followed up by a telephone call asking if he would agree to participate and setting an appointment for an interview. The participation of physicians in our study consisted of the following steps:

– Filling out a questionnaire requesting certain background information about the physician and the organization of his practice: specialty and option type (as a check against profile information); solo versus group practice; fee for service versus salaried remuneration; hospital privileges; medical school appointments; practice expenses; years in practice; association memberships. (See appendix B.)
– Granting a personal interview of about forty-five minutes regarding such matters as hours of work, billing practices (for opted-out physicians), and attitudes toward medical practice, patients, professional and governmental bodies, and a range of issues of health care policy. (See appendix B.)
– Requesting from OHIP his practice profile for the period from January 1975 to January 1976 (OHIP's charge for supplying the profile was borne by us).

Once a physician agreed to participate in our study he was sent the background questionnaire to be completed in advance and a form letter to OHIP requesting two copies of his practice profile – one of them having had all identifying information removed. The physician was interviewed, and the interviewer left the annotated interview protocol with the physician, together with a stamped unmarked envelope addressed to the survey office. The physician was asked to mail the interview protocol, the background questionnaire, and the anonymous copy of his practice profile as a single package to us. He was also given a business reply card to be mailed separately from the package of information identifying him as having responded. Each respondent's anonymous data file was augmented in our offices by information regarding characteristics of the county in which he practised: the number of physicians and hospital beds per capita, and average family income.

We conducted a pre-test of our survey methodology and instruments in Sepember 1975. Since our target was to interview one representative of each of nineteen clinical specialties, as well as nine general practitioners, and since we allowed for a response rate of 25 per cent, we drew a sample of 112 physicians, appropriately distributed by specialty, from the OHIP Metro district register. We contacted these physicians by letter and followed up each letter with a telephone call. We asked each physician if he would agree to

participate in our pilot survey, or, if we had already filled our quota in his particular specialty, if he would participate in our general survey in 1976.

The results were most encouraging. We had no difficulty filling our quota; in fact, of the 112 physicians contacted, 74 per cent agreed to participate, either in the pilot or in the general survey. Only 14.5 per cent refused outright – deaths, retirements, and changes of address accounted for the rest. We conducted twenty-eight interviews, which yielded twenty-five complete packages of data.

Thus encouraged, we sought and were fortunate to receive funding from the Physicians' Services Inc. Foundation, effective 1 July 1976. We could then proceed with the drawing of our sample and with the hiring and training of our seven interviewers.

SAMPLE SELECTION

Our target was 600 interviews, of which no fewer than 150 were to be with opted-out physicians and no fewer than 100 were to be with rural physicians. Since only about 11 per cent of the medical population is opted-out and about 12.5 per cent is rural, a random sample of 600 physicians could be expected to yield only about 66 opted-out physicians and about 75 rural physicians; and our sampling procedure had to be designed to over-sample in these categories.

The source for the sample was the OHIP *L* Report for November 1975. This report lists the OHIP number and specialty code of each physician who has submitted claims to OHIP for that month. The numbers are grouped into two sections: claims to be paid to the physician (that is, claims by opted-in physicians) and claims to be paid to the subscriber (claims submitted by opted-out physicians). The *L* Report, then, provided us with a framework within which we could easily oversample opted-out physicians, but since office location is not identified on the *L* Report an oversampling of rural physicians could not as easily be accomplished. It was therefore necessary to draw an entire sample of a size which could be expected to yield us 100 rural participants, and then simply to sample randomly within the urban component of this sample once practice locations had been identified. Given a projected response rate of 60 per cent (a reasonable projection on the basis of our pilot), and a rural medical population of 12.5 per cent of the total medical population, a sample on the order of 1350 should yield 100 rural respondents. Given that we would be sampling more heavily among opted-out physicians, who are less likely to be in rural areas, it was decided to increase this total somewhat.

A 10 per cent random sample from the physician paid list yielded 1081 physician numbers; and a 25 per cent random sample drawn from the subscriber paid list yielded 373 numbers. Each number was verified in the *Physician and Hospital Index,*[1] *April 1976*, and the name of the physician and the community of his or her residence were recorded as listed. Each physician was then located, where possible, in the *Canadian Medical Directory, 1976*, for the exact address of his or her practice and the telephone number. The practice addresses were then classified as either urban (community population over 10 000) or rural, (non-suburban community under 10 000 population). Since there was still an insufficient number of physicians in the rural group for the proposed analysis, twenty-six rural communities were chosen from a list of all Ontario towns having a population under 10 000, and also having at least one physician in practice in the community. The list was compiled from the *Canadian Medical Directory*, and there were over four hundred listings. Every fifteenth town was chosen, and the number of physicians in the community was noted. If the community had two or fewer physicians, both were added to the sample. If there were more in residence, two were randomly selected from those listed. This procedure added thirty-eight names to the sample. In addition, another fifty-five physicians originally contacted during the pilot phase but not interviewed because of limitations on the size of the study had indicated willingness to participate in the general survey. The names of these physicians were added to the pool of possible respondents. In total, 1547 physicians were chosen for the study. Individual cards were prepared for each number on each list and cross-checked for duplication. This check revealed that twenty-two physician numbers appeared on more than one list. When the twenty-two duplicated cards were removed, the 'cleaned' list comprised 1525 physician numbers.

To facilitate the work of the interviewers, the names of potential respondents were sorted according to fifteen geographical districts, plus Metropolitan Toronto. The sample proportion of physicians in each district was computed, the number needed to maintain this original distribution within the final goal of 600 interviews derived, and mailing lists drawn up. Letters explaining the survey and requesting participation were sent and were followed up by telephone calls from our interviewers requesting interviews. To facilitate scheduling these mail and telephone contacts within geographical districts were staggered over several weeks (except in the case of northern districts where repeat visits would be expensive).

1 An OHIP internal document.

ATTRITION OF SAMPLE

There were thus a number of points at which physicians appearing in our original list could fall out of our sample. The relatively minor problem of duplicate OHIP listings has already been noted. The first major source of attrition, however, occurs with physicians who were found to be 'ineligible' for our survey: this category (7.1 per cent of our original sample) includes those who were retiring or had retired, those who had moved, and those who were ill or deceased. In addition, a substantial number of potential respondents (32.1 per cent) were never contacted. It will be remembered that in an effort to ensure sufficient rural respondents we were obliged to acquire a surplus of urban physician numbers, many of which were never used once interviewers had filled their quotas in particular regions.

A second major point of attrition occurred after the initial contacts had been made. In all, 31.3 per cent of those originally contacted refused to participate, a proportion we find to be gratifyingly small for such survey research and one that we feel attests to the concern of Ontario physicians with the dealt with in our survey and to their willingness to contribute to the discussion of these issues.

The third stage of attrition occurred after the interviews. Leaving the entire package of instruments with the physician was necessary to ensure anonymity but costly in terms of data. Some physicians may have reconsidered their participation after the interview; in other cases one or other of the instruments appear to have been mislaid, since some returned packages were incomplete; and in some cases problems with the mail may have occurred (the mail-back period included the Christmas rush). Whatever the reasons, fifty-seven interviews, representing 6.2 per cent of the physicians originally contacted, yielded either no returned packages or incomplete returned packages.

The extent to which the responding sample of 574 physicians is further reduced depends upon the sort of analysis to be undertaken. In particular, any analysis for which profile information (as opposed to the self-reported behavioural and attitudinal information contained in the interview and questionnaire) is required, analysis had to be restricted to 420 cases. In 154 cases, that is, profiles were judged to be unrepresentative of the respondent's actual clinical workload for a number of reasons:

– In twenty-nine cases the respondent reported a major change in the location or type of his practice during the period covered by the profile. Since the

TABLE A.1

Breakdown of sample by urban/rural location and option status

	Ontario medical population, CMD, 1976 (N=13 138)	Original sample (N=1547)	Duplicates, ineligible, not used (N=628)	Original contacts (N=919)	Interviews (N=631)	Returned packages (N=574)	Usable sample (N=420)	Weighted sample (N=586)	Regression sample (N=309)
Urban	(87.5)	1371 (88.6)	576 (91.7)	795 (86.5)	532 (84.3)	425 (74.0)	316 (75.2)	316 (81.9)	252 (31.6)
Rural	(12.5)	170 (11.0)	46 (7.3)	124 (12.5)	99 (15.7)	86 (15.0)	70 (16.7)	70 (18.1)	57 (18.4)
Unclassified	–	6 (*)	6 (*)	–	–	63 (11.0)	34 (8.1)	–	–
	Physicians submitting claims to OHIP, November 1975 (N=11 327)								
Opted-in	(88.4)	1161 (75.0%)	509 (81.1)	652 (70.9)	456 (72.3)	402[a] (70.0)	296 (70.5)	279 (72.3)	227 (73.5)
Opted-out	(11.6)	386 (25.0)	119 (18.9)	267 (29.1)	175 (27.7)	172[1] (30.0)	124 (29.5)	107 (27.7)	82 (26.5)

a The opted-out sample is augmented and the opted-in sample diminished at this point by respondents who had previously been treated as opted-in but who defined themselves as opted-out (see text).

NOTE: Percentages in parentheses; asterisk means less than 1.0 per cent.

interview dealt only with his current mode of practice it would be unrealistic to link the interview information with the profile.
– Another twenty-five cases comprised the diagnostic radiologists and pathologists in our sample. Because they are commonly associated with laboratories the billing procedures of these physicians cannot be assumed to represent their individual clinical workloads.
– In the remaining 129 cases, profiles could not be assumed to represent clinical workload for a miscellany of reasons. Falling into this category were (a) physicians who were retained on salary by private companies, such as insurance companies, to perform services not chargeable to OHIP; (b) physicians whose practice included a substantial level of patient services such as cosmetic surgery, not chargeable to OHIP; (c) physicians with salaried appointments at health care institutions (such as psychiatric hospitals) who were providing patient care for which OHIP was not billed. A decision to exclude any of these doctors from the data base was made on the basis of the proportion of their professional remuneration which was in salaried form, their estimation of the proportion of their total professional income derived from OHIP billings, their reported hours of patient-care, and their billings as contained in their profiles.

For investigations where information as to urban or rural location is required, either as an item of data in itself or in order to weight observations to overcome the rural stratification bias, the sample is further reduced to 386. In thirty-four cases the information as to urban or rural location was not entered on the interview protocol.

Finally, for those investigations (such as our simultaneous system of regression equations) where complete data on all cases is required, the usable sample shrinks to 309. In all other cases, observations are missing with respect to at least one of the variables listed in appendix C.

Table A.1 reports the attrition of our sample within the segments for which we stratified: urban-rural location and option type. The stratification for urban-rural location appears first at the stage of original contacts, which exclude among other things the unused urban physician numbers. All of our rural physician numbers were used, but ineligibilities were higher than expected at 26.5 per cent of the original sample. Thus, despite relatively high participation rates among rural physicians, we failed to meet our target of one hundred rural respondents. The shortfall would have been less had not our interviewers failed to note urban or rural location on several interview protocols. As it was, we had eighty-six identifiably rural responses.

TABLE A.2

Attrition of sample by specialty group: opted-in physicians

	Ontario medical population, Nov. 1975 (N=10 009)	Original sample (N=1161)	Duplicates, ineligible, not used (N=509)	Original contacts (N=652)	Refusals (N=196)	Inter-views (N=456)	Returned packages[a] (N=402)	Usable sample (N=296)	Weighted sample (N=279)	Regression sample (N=227)
General practice	(52.9)	597 (51.4)	293 (57.6)	304 (46.6)	82 (41.8)	222 (48.7)	200[b] (49.8)	149 (50.3)	147 (52.7)	127 (55.9)
Medical specialties	(11.2)	125 (10.8)	59 (11.6)	66 (10.1)	25 (12.8)	41 (9.0)	38 (9.4)	23 (7.8)	21 (7.5)	16 (7.0)
Obstetrics/ gynaecology	(3.9)	45 (3.9)	14 (2.8)	31 (4.8)	12 (6.1)	19 (4.2)	14 (3.5)	12 (4.1)	10 (3.6)	10 (4.4)
Paediatrics	(3.8)	44 (3.8)	13 (2.6)	31 (4.8)	7 (3.6)	24 (5.3)	16 (4.0)	10 (3.4)	10 (3.6)	6 (2.6)
Surgical specialties	(14.6)	194 (16.7)	81 (15.9)	113 (17.3)	37 (18.9)	76 (16.7)	76 (18.9)	69 (23.3) **	63 (22.6) **	49 (21.6) **
Anaesthesia	(4.0)	43 (3.7)	14 (2.8)	14 (4.4)	8 (4.1)	21 (4.6)	19 (4.7)	21 (7.1)	17 (6.1)	12 (5.3)
Psychiatry	(5.1)	58 (5.0)	18 (3.5)	40 (6.1)	13 (6.6)	27 (5.9)	17 (4.2)	12 (4.1)	11 (3.9)	7 (3.1)
Radiologists and pathologists	(3.5)	55 (4.7)	17 (3.3)	38 (5.8)	12 (6.1)	26 (5.7)	22 (5.5)	–	–	–
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

a Some respondents previously defined as opted-in were identified as opted-out at this point and therefore do not appear in the last three columns of this table (see text).

b Eight respondents appearing as general practitioners in this and previous columns were subsequently recoded as anesthetists (see text).

NOTE: Percentages in parentheses. Double asterisks indicate significant difference from population proportion ($p < 0.05$), calculated for the last three columns only.

TABLE A.3

Attrition of sample by specialty group: opted-out physicians

	Ontario medical population, Nov. 1975 (N=1318)	Original sample (N=386)	Duplicates, ineligible, not used (N=119)	Original contacts (N=267)	Refusals (N=92)	Inter-views (N=175)	Returned packages[a] (N=172)	Usable sample (N=124)	Weighted sample (N=107)	Regression sample (N=82)
General practice	(26.8)	118	44	75	20	55	41	29	27	17
		(30.6)	(37.0)	(28.1)	(21.7)	(31.4)	(23.8)	(23.4)	(25.3)	(20.7)
Medical specialties	(5.4)	25	10	15	4	11	11	9	6	5
		(6.5)	(8.4)	(5.6)	(4.3)	(6.2)	(6.4)	(7.3)	(5.6)	(6.1)
Obstetrics/ gynaecology	(14.0)	28	3	25	9	16	19	16	12	11
		(7.3)	(2.5)	(9.3)	(9.8)	(9.1)	(11.0)	(12.9)	(11.2)	(13.4)
Paediatrics	(2.2)	6	0	6	4	2	4	3	3	2
		(1.6)		(2.2)	(4.3)	(1.1)	(2.3)	(2.4)	(2.8)	(2.4)
Surgical specialties	(25.4)	102	28	74	31	43	39	29	26	19
		(26.4)	(23.5)	(27.7)	(33.7)	(24.6)	(22.7)	(23.4)	(24.2)	(23.2)
Anaesthesia	(10.5)	43	20	23	10	13	13	10	8	6
		(11.1)	(16.8)	(8.6)	(10.9)	(7.4)	(7.6)	(8.1)	(7.4)	(7.3)
Psychiatry	(13.5)	55	9	45	13	32	41	28	25	22
		(14.2)	(7.6)	(16.9)	(14.1)	(18.3)	(23.8)	(22.6) **	(23.4) **	(26.8) **
Radiologists and pathologists	(2.1)	9	5	4	1	3	4	–	–	–
		(2.3)	(4.2)	(1.5)	(1.1)	(1.7)	(2.3)			
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

a Some respondents previously defined as opted-in were identified as opted-out at this point and therefore appear in this table only in the last three columns (see text).

NOTE: Double asterisks indicate significant difference from population proportion ($p < 0.05$), calculated for the last three columns only.

TABLE A4

Non-participation rates by specialty group and option

		Original contacts	Declined to participate	Did not return package[a]
General practice	In	304	82 (27.0)	52[b]
	Out	75	20 (26.7)	(13.7)
Medical specialties	In	66	25 (37.8)	3
	Out	15	4 (26.7)	(3.7)
Obstetrics/ gynaecology	In	45	12 (26.7)	2
	Out	25	9 (36.0)	(2.9)
Paediatrics	In	31	7 (22.6)	6
	Out	6	4 (66.7)	(16.2)
Surgical specialties	In	113	37 (32.7)	4
	Out	74	31 (41.9)	(2.1)
Anaesthesia	In	29	8 (27.6)	2
	Out	23	10 (43.5)	(3.8)
Psychiatry	In	40	13 (32.5)	1
	Out	45	13 (28.9)	(1.2)
Radiologists and pathologists	In	38	12 (31.5)	3
	Out	4	1 (25.0)	(7.1)
All specialties	In	652 (100.0)	196 (30.1)	57
	Out	267 (100.0)	92 (34.5)	(6.2)
Total		919 (100.0)	288 (31.3)	57 (6.2)

a Several respondents previously treated as opted-in defined themselves as opted-out and hence fell into the opted-out sample once their responses were received. Such transfers

We did however exceed our target of 150 opted-out respondents, despite their slightly higher non-participation rates compared to opted-in physicians. In part this result is due to the fact that there were fewer 'ineligibles' within our original opted-out sample. It is also due to the fact that some physicians were reclassified from the opted-in to the opted-out sample once their responses had been received. These were physicians who were in fact opted-out but who had some small opted-in billings under one of the exceptions to the 'practice-streaming' rule as discussed in chapter 1. They therefore appeared among the opted-in physicians in the OHIP *L* Report and were included in our original opted-in sample.

Tables A.2 and A.3 report the attrition of our opted-in and opted-out samples by specialty group, and Table A.4 reports specifically non-participation rates. In general, the specialty group proportions within our usable opted-in and opted-out samples are similar to those in the opted-in and opted-out medical populations. In only two cases – opted-in surgeons and opted-out psychiatrists – are sample proportions significantly different from population proportions.

Some individual specialty groups deserve specific comment. Among general practitioners the effects of relatively high ineligibilities and high non-return rates appear to be cancelled out by relatively high participation rates in both the opted-in and opted-out samples. As we shall see, however, there appears to be some response bias on the part of opted-out general practitioners on the basis of their billing volumes. Among opted-out medical specialists we encountered no problems; but we underrepresent opted-in medical specialists (although not significantly), because of their high non-participation rates. Non-participation does not appear to have been affected by volume of billings, as we shall see. Opted-in obstetricians also have a relatively high non-participation rate (although again this does not appear to be related to volume of billings). However, they survive attrition at other points in the sample, and their representation is proportionate. Opted-out obstetricians were for some reason severely underrepresented in our original sample. There is some compensation for this initial underrepresentation,

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from the opted-in to the opted-out sample make non-return rates by option type unreliable, and hence these rates are reported for specialty groups in their entirety (see text).

b Includes eight respondents subsequently recoded as anesthetists (see text).

NOTE: Percentages in parentheses

because they survive attrition at subsequent stages, but they remain slightly underrepresented in our descriptive statistics samples.

Opted-in surgeons are significantly overrepresented; they were originally somewhat overrepresented, and this initial overrepresentation is exaggerated at almost every stage of the refinement of the sample. Opted-out surgeons similarly tend not to be excluded from the sample for technical reasons of ineligibility or unrepresentative profiles, and they maintain a proportionate representation in our sample despite their relatively high non-participation rates. Opted-in anaesthetists appear to be overrepresented in our sample; but this phenomenon is due to the inclusion in the anaesthesia category of a number of non-certified anaesthetists, that is, general practitioners limiting their practice to anaesthesia. Since their profiles contain only anaesthetic fee schedule codes, it was felt most appropriate to include them in this category. Opted-out anaesthetists on the other hand are slightly underrepresented in our sample, a result due largely to their somewhat higher ineligibility and non-participation rates.

In psychiatry notable differences between the opted-in and opted-out samples occur. Opted-in psychiatrists have relatively high non-participation rates, and those who did participate were more likely than most specialists to be excluded on the basis of unrepresentative profiles. Furthermore, as we shall see there appears to have been some response bias on the basis of billing volume. Opted-out psychiatrists on the other hand were overrepresented in our original sample, and this initial over-representation is subsequently exaggerated by their high eligibility, participation, and return rates and by their generally representative profiles. They are accordingly significantly overrepresented in our sample. Finally, diagostic radiologists and pathologists are proportionately represented in our sample, but as noted above they were excluded as having unrepresentative profiles.

RESPONSE BIAS BY BILLING VOLUME

In addition to looking for possible response biases by specialty, option, and urban or rural location, we were also interested to discover whether the volume of a physician's OHIP billings was related in any way to his propensity to respond to our survey. Accordingly, we asked OHIP to produce aggregate data comparing the billing volumes of those physicians originally contacted who either did not participate in our survey or who did not return their data packages with the billing volumes of those physicians who returned postcards indicating that they had mailed their data packages to us. The mean OHIP billings of respondents and non-respondents so defined, over the nine-

TABLE A.5

Mean billings of respondents and non-respondents by specialty and option: urban physicians

	Opted-Out					Opted-in				
	Respondent		Non-respondent		Significant differences	Respondent		Non-respondent		Significant differences
	N	$	N	$		N	$	N	$	
General practice	47	25 723.88	23	31 179.95	**	133	42 464.99	64	40 587.76	
Medical specialties	(11)	–	(4)	–		41	47 876.10	24	40 475.07	
Obstetrics/gynaecology	16	56 601.81	9	50 805.64		17	58 506.14	14	48 523.48	
Paediatrics	(2)	–	(4)	–		22	40 893.00	9	66 665.09	**
Surgical specialties	39	66 872.23	33	56 731.22		70	57 559.37	39	57 916.70	
Anaesthesia	13	33 258.71	9	38 244.52		20	51 408.01	8	41 381.31	
Psychiatry	30	35 192.83	13	34 692.29		25	27 327.59	12	39 405.31	**
All	145	42 832.54	87	44 157.21		328	46 480.18	170	46 535.12	

NOTE: A dash means not reported by OHIP for reasons of confidentiality since at least one of the cell entries in this specialty group is less than 5. Double asterisks indicates a significant difference ($p < 0.05$).

month period from May 1975 to January 1976, are reported in table A.5 by option type and specialty group for urban physicians. A comparable breakdown cannot be reported for rural physicians: in order to preserve confidentiality, OHIP would not report means calculated on a base of less than five, and within our small rural sample most cells in a specialty-option breakdown had Ns less than this limit. There is no significant difference between the mean billings of rural respondents ($41 575.92) and those of non-respondents ($38 406.53) in general.

Two caveats need to be issued regarding the interpretation of the data in Table A.5. In the first place the respondent category contains some non-respondents; and the non-respondent category may contain some respondents. As noted earlier, we conducted 631 interviews; 621 postcards claiming participation were received by our office, although only 574 packages were returned. For at least forty-seven of those who claimed participation, then, we did not receive complete packages. Furthermore, the non-respondent category comprises those who refused on initial contact to participate as well as the ten physicians (at least) who were interviewed but did not indicate by postcard that they had returned their data packages. In some of these ten cases it is possible that the packages were in fact returned but the postcards were either not mailed or lost in the mail. At any rate we would expect these effects to be random across specialty groups, option types, and levels of billing volume, so that results in Table A.5 ought to reflect in general the differences between our respondents and our non-respondents.

The second caveat concerns the significance of the differences between respondents and non-respondents. OHIP did not calculate standard deviations, and it was therefore impossible to perform exact *t*-tests on these differences between means. We did perform *t*-tests, however, using as a pooled estimate of the variance within the respondent and non-respondent segment of each specialty group, the standard deviations about the mean OHIP billings of each specialty group in our usable opted-in and opted-out samples. In most cases our sample means fall between the means of respondents and non-respondents as reported in Table A.5; in no specialty group does our sample mean fall below the lower of the two values reported by OHIP, and in a few cases our sample mean is higher than either. If one assumes that these billing data are heteroscedastic (that is, that the size of this standard deviation increases with the size of the mean), it is possible that our *t*-tests may in a few cases underestimate the significance of the differences between the means in Table A.5. In general, however, they ought to be reasonably accurate.

Within each sample, opted-in and opted-out as a whole, there are no significant differences between respondents and non-respondents at the 95 per cent confidence level in terms of their mean billing volumes. Indeed, when these samples are broken down into specialty groups, differences significant at the 95 per cent level occur in only three cases. Opted-out respondents in general practice have significantly lower mean billings than do their non-respondent counterparts, a finding discussed in the text in commenting upon the low billing volumes of the opted-out general practitioners in our sample. Considerably more striking, however, are the differences between non-responding and responding opted-in paediatricians: non-respondents have billings on average 63 per cent higher than do respondents.[2] Finally, non-respondent opted-in psychiatrists have billings on average 44 per cent higher than do those who responded. The low mean billings of the opted-in psychiatrists who responded may be due to the presence within this segment of our sample of a number of physicians with salaried appointments in psychiatric hospitals, whose OHIP profiles may reflect only a small proportion of their actual clinical workloads. Such respondents were subsequently excluded from our analysis as having unrepresentative profiles, and the mean billings of psychiatrists in our usable opted-in sample ($34 166.09) is much closer to the mean for non-respondents. Nonetheless, we have taken this response bias into account in interpreting differences between opted-in and opted-out psychiatrists.

The tendency for non-respondents to have higher mean billings than respondents, although it appears in the three cases in which we find significant differences between these two groups, is not systematic across all specialties. Indeed, in most other cases the billings of respondents are somewhat different than those of non-respondents, although these differences are not significant at the 95 per cent level.

WEIGHTING

At various stages in the analysis (descriptive statistics, tests for differences between means of sub-groups, the option equation) it was necessary to adjust for the fact that our sample of physicians was not completely represen-

2 In the bivariate analyses this difference presents a problem only in so far as it distorts findings for the opted-in sample as a whole. Given the small number of opted-out paediatricians in our sample we do not report findings for paediatricians as a distinct group.

tative of the whole population of fee-for-service practitioners. In particular, our sample overselected opted-out physicians and those with rural practices to ensure a sufficient number of observations in these two categories. Accordingly, when drawing inferences about the true population from the observed characteristics of the sample it is necessary to weight the observations in such a way as to simulate their representativeness in the true population. In other words, it is necessary to deflate the impact of the opted-out or rural observations compared to those that are opted-in or urban. The appropriate weights for these adjustments were derived from estimating the proportion of various categories of practitioners in the true population; adjusting weights were then computed as the ratio of the population proportion to the proportion of that subgroup found in our sample. For the population as a whole, and for each subgroup, we then proceeded to estimate the population proportions.

We set up a four-quadrant analysis as follows:

	Opted-in	Opted-out	
Urban	A	B	Total urban
Rural	C	D	Total rural
	Total opted-in	Total opted-out	Grand total

We obtained information on the total opted-in and opted-out from the Ministry of Health. From the *Canadian Medical Directory* we were able to estimate the proportion of physicians with urban practices and thus to compute the total urban and total rural figures. With these totals in hand, one further observation in any of the four cells (opted-in urban, opted-in rural, opted-out urban, opted-out rural) would suffice to enable us to fill in the rest of the matrix. Unfortunately no further information on this breakdown was available from independent sources, and we had to estimate one of the four proportions from our sample. Our sampling procedure did provide an estimate of the number of physicians who fell into any one of the four cells as a proportion of either the row or the column in which the cell appeared. Thus,

from any one of these proportions, the number of physicians in that cell for the population as a whole could be computed, and thereby the numbers in the other three cells.

The derivation of descriptive statistics required only two of these cells for any one calculation. Testing for differences between the means of opted-in and opted-out physicians by specialty group required us to calculate weighted means for opted-in physicians, using cells *A* and *C*, and for opted-out physicians using cells *B* and *D*. Means for opted-in and opted-out physicians in general were calculated by aggregating these weighted specialty group means according to the specialty group proportion in the population. Similarly, *t*-testing for differences between urban and rural physicians required us to calculate weighted specialty group means for the former, using cells *A* and *B*, and for the latter using cells *C* and *D*, and then to aggregate the specialty group means.

In the running of the OPTION regression in chapter 5, all four of the quadrants noted above were used to weight observations.

APPENDIX B

Questionnaires

Col. No.
Code

PHYSICIAN'S BACKGROUND INFORMATION

Please answer the following questions as of April, 1975:

4 — 1. (a) In which specialty, if any, are you certified? _____

5-6
7-8 — (b) If you are certified in any specialty, what percentage, if any, of your practice is general practice? _____

9-11
12-14 — 2. (a) What proportion of your practice is:

Solo Practice _____

Group Practice _____

15-16 — (b) If in group, how many: Specialists _____

17-18 — G.P.'s _____

19 — 3. (a) At how many hospitals do you have privileges? _____

(b) What type of hospital privileges do you hold? (Include all appointments)

20 — Active _____

21 — Associate _____

22 — Courtesy _____

23 — Consultant _____

24 — (c) Do you have an appointment to the teaching staff of a medical school? No _____

Part-time _____

Full-time _____

4. What percentage of your remuneration for professional services comes from:

25-27 — Fee-for-service _____

28-29 — Salary _____

30 — 5. (a) Do you bill: OHIP _____

Patient _____

31 — (b) Were you a participating physician in PSI? Yes ___ No ___

Not in practice (in Ontario) prior to OHIP _____

32-37 6 (a) What were the total expenses of your practice last year? (Group expenses if a member of a group) $ _____

38-43 Expenditures for salaries: $ _____

44 (b) Number of: (Full time equivalents) Secretaries _____

45 Nurses _____

46 Technicians _____

47 Others _____

48-49 (c) Number of examining rooms: _____

50 (d) Do you own an electrocardiogram machine? Yes ____ No ____

51 (e) Do you have your own x-ray machine? Yes ____ No ____

52-53 (f) Do you have any other specialized equipment (specify)? _____

PERSONAL CHARACTERISTICS

54-55 7. (a) Age _____

56 (b) Sex M ____ F ____

57 (c) Marital Status: Married _____

Single _____

Divorced or Separated _____

Widowed _____

58 (d) Number of dependents _____

59 (e) If married, is your spouse employed? No _____

Full-time _____

Part-time _____

60-61 (f) Years of practice in present neighbourhood _____

62-63 (g) Total years in practice _____

64 (h) In what country were you born? _____

65 (i) What is your present citizenship? _____

66 8. (a) On what hospital medical staff committees do you serve/or have you served?

None _____

Medical Advisor _____

Credentials _____

Tissue and audit _____

Admissions and discharge _____

Medical records _____

Other _____

68 (b) Are you a member of the O.M.A.? Yes ___ No ___

69 If yes, have you ever been active on its committees or sections? Yes ___ No ___

70 (c) Are you or have you been involved with health related community organizations? (For example: hospital planning councils, district health councils, CARS, Canadian Heart Foundation, etc.) Yes ___ No ___

(d) For Specialists:

71 Are you a member of your specialist association? Yes ___ No ___

72 Have you ever been active on its committees? Yes ___ No ___

(e) For All Physicians

73 Are you a member of the College of Family Physicians? Yes ___ No ___

74 Have you ever been active on its committees? Yes ___ No ___

75 9. Have there been major changes with respect to any of the information on this questionnaire since April, 1975?

Yes ___ No ___

76 If so, please specify _____

77 _____

PHYSICIAN INTERVIEW QUESTIONNAIRE

NOTE: In this interview, we will be asking you about your current pattern of practice. Have there been any major changes since April, 1975 in terms of the structure of your practice, your patient load, the way in which you distribute your time, the sources of your income, your billing practices, or your use of lab facilities?

Yes _____ No _____

If yes, please describe _____

_____

Col No.
Code

HOURS OF WORK

1. (a) Number of weeks worked per year? _____

(b) Think of your last typical week. How many hours exclusive of 'on call' time, did you work that week? _____

(c) Number of hours 'on call' that week? _____

(d) Number of days, or half days off that week, including weekends? _____

(e) Number of hours of in-patient care that week in hospital or nursing home _____

(f) Number of hours of patient care that week in outpatient or emergency department? _____

(g) Number of hours of patient care that week in the office (not outpatient department)? _____

(h) Number of hours of patient care that week in the patient's home? _____

(i) Number of hours that week spent in paper work, committee work, rounds, compulsory staff meetings, continuing education, journals and tapes? _____

(j) Number of hours that week in teaching and research? _____

SOURCES OF INCOME

2. (a) What percentage of your gross professional income is derived from OHIP? _____

(b) What percentage of your gross professional income is spent on practice expenses? _____

(c) What percentage of your total family income comes from your net professional income? _____

(d) Do you feel secure enough financially to reduce the volume of your practice if you chose to do so? _____

(Ask only of group practice physicians)
(e) How are the practice expenses shared among your group/ between you and your partner. _____

(f) How is the income shared among your group/between you and your partner? _____

BILLING PRACTICES (For Opted-Out Physicians)

3. (a) Why did you decide not to participate in the OHIP Plan? (Choose up to two)

- To maintain a close doctor-patient relationship _____
- To help preserve a system of 'private' medical practice outside the government plan _____
- OMA fee schedule is inadequate _____
- OHIP proration of OMA fee schedule is inadequate _____
- Principle of proration is unacceptable _____
- Patients should be aware of the cost of service _____
- To preserve a means of protest against government policies _____
- Other

(b) Was your decision influenced by the advice of any of the following groups?

- O.M.A. _____
- Specialist association _____
- College of Family Physicians _____
- Hospital staff association or local medical society _____
- Colleagues _____
- None _____

(c) What percentage of your services are billed at the O.M.A. rate? _____

(d) In what percentage of your cases do you accept 90% of the O.M.A. rate? _____

(e) Is the amount billed related to the patient's ability to pay? Yes _____

(f) What percentage of your services are billed above the O.M.A. rate? _____

On the average, by how much? _____

(g) In what percentage of your cases do you accept 90% of the O.M.A. rate because of the cost and inconvenience of collecting the remainder of the fee? _____

(h) What percentage of total billings are lost through default and collection agency fees? _____

COMPOSITION OF PRACTICE

4. (a) Do you accept new patients? Yes ___ No ___

If not:

(b) Do you think you could significantly increase your patient load by accepting new patients? Yes ___ No ___

(c) Why did you close your practice at the presen level? _____

_____

LAB AND X-RAY

5. (a) What proportion of lab work ordered from your office is done:
   - at the hospital _____
   - Provincial lab _____
   - Group lab _____
   - Commercial lab _____
   - In your own office _____

   (b) What proportion of x-rays ordered from your office on out-patients is done:
   - at the hospital _____
   - Private radiologists office _____
   - Group x-ray department _____
   - Your own x-ray unit _____

SCHEDULING

6. To save time, you may wish to have your receptionist answer the following questions:

   (a) How many hours per week do you schedule for office visits? _____

   (b) What is the average number of patients in the waiting room at any time during office hours? _____

   (c) What is the largest number at any one time? _____

   (d) How many seats are there in the waiting room? _____

   (e) What is the average waiting time (in days) for an appointment in a non-urgent situation? _____

   (f) What percentage of patients is see as a result of an appointment made on the day of service? _____

   (g) What percentage of patients is seen without any appointment? _____

WORKING CONDITIONS

7. (a) How many times in the past week (if at all) have you felt that you were unable to give your patients enough time? _____

   (b) How many times in the past month (if at all) do you feel that your service to patients has suffered as a result of your having worked too many hours? _____

(c) In general, are you satisfied with the working conditions associated with your medical practice?

Very _____

Moderately _____

Little _____

Not at all _____

SATISFACTION WITH PRACTICE

8. (a) How important are the following factors to you?

	very	moderately	little	not
The challenge of exercising diagnostic and therapeutic skills to the best of your ability				
Respect of peers				
Financial security				
Having control over your own work				
Providing services for which there is great demand				
Attractive working conditions				
Other				

(b) How important are the following characteristics of medical practice in terms of the lack of satisfaction they cause you?

	very	moderately	little	not
Long and/or unpredictable hours of work				
Too many patients per hours				
Increasing governmental intervention				
Lack of respect from patients				
Demands of paperwork				
Involvement with medical administration				
Peer review mechanisms				

PATIENT BEHAVIOUR

9. (a) What percentage of the patients who seek attention from you do so, in your medical opinion, without reasonable cause? _____

(b) What percentage of the patients who seek attention from you should, in your medical opinion, have sought medical help sooner than they did? _____

(c) How often do you see the following types of problem patient?

	often	sometimes	seldom
A patient who insists on referral to another consultant or on a second opinion even though you feel it unnecessary			
A person who insists that you authorize a particular test even though you feel the test is unnecessary			
A patient who insists on a medical certificate which you feel is unjustified			
A patient who makes frequent office visits but fails to comply with your instructions			
A patient who lacks gratitude although you have conscientiously taken care of him			
A patient who persistently complains although you are doing all you can to help him			

(d) Do you feel that patients should be required to pay a part of the cost of their medical expenses in order to deter them from seeking medical care without reasonable cause?

Yes ____ No ____

Depends on patient's income _____

Col. No. 335
Code

ROLE OF PROFESSIONAL BODIES

10. (a) How would you rate the influence of the following organizations over the way you practise medicine:

	great	moderate	little	none
College of Physicians and Surgeons				
Medical Review Committee of the College of Physicians & Surgeons				
College of Family Physicians				
Specialty association				
O.M.A.				
Hospital medical staff committees				
Hospital department				
University department				
Other (specify)				

(b) Do you feel that the degree of influence of these organizations is appropriate?

	too much	about right	too little
College of Physicians and Surgeons			
Medical Review Committee of the College of Physicians & Surgeons			
College of Family Physicians			
Specialty Association			
O.M.A.			
Hospital medical staff committees			
Hospital department			
University department			
Other			

Col. No.
Code ____ (c) How do you seek to influence government policy toward the profession?

- Through the O.M.A. _____
- Through your hospital medical staff _____
- Through the College of Physicians and Surgeons _____
- Through your specialist association (or the College of Family Physicians). _____
- Through your M.P. or M.P.P. _____
- Through letters or direct contact with the Minister of Health or others in his Ministry _____
- Through letters to the editor or other appeals to the general public _____
- Other _____

(d) Are you aware of Ontario's new Health Disciplines Legislation?

Yes _____ No

If yes, what do you consider to be its most important provisions? _____

_____

METHODS OF RENUMERATION

11. (a) Which of the following modes of remuneration are acceptable to you?

Fee for service _____

Capitation _____

Salary _____

Other _____

(b) Should there be a medical fee schedule?

Yes ___ No ___

Only as a guide to appropriate charges _____

(c) How should the rate of physicians' remuneration under OHIP be established?

Set by O.M.A. _____

Negotiated between O.M.A. and government _____

Negotiated between various groups of physicians and government _____

Other _____

(d) Are you aware of the activities of the Joint Committee on Physicians' Compensation?

Yes ___ No ___

Col. No.
Code ____

(e) If so, do you approve of this mechanism of negotiation? Yes ___ No ___

(f) How attractive to you as a physician are the following types of provincial medical insurance program?

	very attractive	acceptable	unacceptable
The present OHIP plan (which allows opting out)			
An OHIP plan which does not allow opting out			
An OHIP plan offering a choice of billing procedure in individual cases			
An OHIP plan in which physicians might opt to be paid on a capitation basis			

HEALTH CARE DELIVERY

12. (a) How attractive to you as a physician are the following ways of organizing the delivery of medical services.

	very attractive	acceptable	unacceptable
Through group practices, medically controlled			
Through solo practices			
Through community clinics managed by lay and medical boards			

(b) Do you approve of the development of teams of physicians and other health workers?

Yes, with the leadership of the team rotating among the team members as patients' problems require. _____

Yes, but only as long as the leadership of the team is exercised by physicians _____

No _____

Col. No.
Code ____

(c) An appropriately-trained paediatric nurse should be able to provide well-baby care:

under medical supervision _____

on referral from a physician _____

independent of medical supervision or referral _____

not at all _____

(d) Optometrists should be able to administer diagnostic drugs to the eye:

under medical supervision _____

on referral from a physician _____

independent of medical supervision or referral _____

not at all _____

(e) Pharmacists should be able to choose among equivalent drugs in the Parcost formulary in filling medical prescriptions:

in all cases where equivalent drugs are available _____

never _____

the prescribing physician should retain the right to specify 'no substitution' in some cases _____

(f) In recommending treatment, should the physician base his judgment only upon the patient's medical condition, or should he also take into account either or both of the following factors:

(i) the patient's individual preferences _____

(ii) the costs of treatment _____

(iii) only the physical condition _____

Col. No.
Code

FORMATION OF HEALTH POLICY

13. (a) What degree of influence should each of the following groups ideally have in planning the delivery of health services?

	a great deal	some	little	none
the medical profession				
other health disciplines				
lay representatives of the community				
federal government				
provincial government				
local government				
other				

(b) How would you rate the influence which they actually have at the present time?

	a great deal	some	little	none
the medical profession				
other health disciplines				
lay representatives of the community				
federal government				
provincial government				
local government				
other				

(c) In general, would you say that O.M.A. policy represents your own views regarding changes in the way health care services are delivered;

or would you say that you are more liberal (favouring a greater degree of change) or more conservative (favouring less change)?

- more liberal than O.M.A. _____
- more conservative than O.M.A. _____
- in agreement with O.M.A. _____

(d) If advised to do so by a professional association, would you ever withdraw or curtail your services to protest a government policy?

Yes ____ No ____

(e) What, in your opinion, is the major health care issue facing the profession and government today? _____

_____

APPENDIX C

Data guide

The principal sources of data for the study were the Interview and Background Questionnaire and the various reports produced by OHIP within their Physician Profiles System. Data released by OHIP to those physicians participating in the study and forwarded to us were drawn from the following reports for January 1976.[1]

– Report 3: *Personal Data*. This report contains various items of information extracted from the OHIP Registry of Physician/Practitioners including birth date, billing option, practice type, practice location, school and country of graduation, etc. The information is that which was applicable at the latest reporting month for any profile (January 1976 in this instance). Thus changes in practice status, location, etc. during the time period covered by the profile are not recorded in the data.
– Reports 4-9: *Services Rendered by Fee Schedule Code*. This report lists all the services rendered by the physician for the month requested plus each of the eleven previous months plus a twelve-month total. For comparison purposes a set of averages of other physicians of the same specialty in the same county, in the same district, and in the province as a whole are listed for the latest month reported. Each service is identified by a fee schedule code which corresponds to the code in the OMA Schedule of Fees.
– Report 11: *Services Rendered by Fee Schedule Code Blocks*. The services rendered by the physicians are broken down into eighteen separate classifications. Against each classification of fee schedule codes or code blocks is shown an analysis for the latest service month and eleven previous months

1 For further information on the nature of various reports the reader is referred to *Physician/Practitioner Profiles System, Users Manual*, OHIP.

with county, district, and provincial comparative statistics for physicians of the same specialty.
– Report 12: *Referrals Made*. This report deals with services provided to the physician's patients because of a referral by the physician for each of the previous twelve months. Services are again blocked (but differently to that in Report 11), and comparison statistics are again provided for the last month reported.
– Report 14: *Services by Other Practitioners and Physicians*. Whereas the *Referrals Made* report provides an analysis of the services rendered to the physician's patient on account of specific referrals by him, this report covers all services rendered to his patients by other physicians during each of the previous twelve months, together with county, district, and provincial averages on the physician's specialty for the latest month reported.
– Report 16: *Frequency of Encounter*. This report provides, for the latest and eleven previous months, counts of patients with one to five or more encounters within that month. Comparative statistics are provided for the last month reported. The encounters analysed include only selected personal services and are thus only an approximation of true frequency of encounter.
– Report 17: *Services by Age and Sex*. This report classifies the physician's patients into age and sex groups. The classifications are made up of the following groups (for male and female categories): 0–1 year, 1–4 years, and 5 year increments thereafter up to 64 years, and from 65–99 years. Data are reported for each of the twelve months and comparative statistics for the last month.

Patient counts are derived from an analysis of the OHIP numbers and participant numbers assigned by OHIP. These are presumably discrete only within months and not across months, i.e. the same patient seen twice within a month is counted as only one patient but if seen the next month is counted again. Consequently, aggregating patient counts across months would overestimate the patient load of a particular physician.
– Report 18: *Frequency of Treatment*. This provides a measure of the contacts with the same patient in previous service months by this physician. The report covers all contacts, regardless of service provided, and is the only report which follows an individual patient *across* months as well as *within* months. These patient counts are shown for the latest and eleven previous months, together with comparative statistics for the latest month reported.

It should be noted that, although the January 1976 profiles contained data for the previous twelve months, we used only data for the period May 1975 to January 1976, so that our analysis would not be complicated by the fee schedule changes introduced on 1 May 1975.

Data on hospital beds by Ontario county were provided by OHIP and based on the Hospital Bed Inventory Report. This report furnishes information on active, chronic, and mental patient treatment beds in each hospital but only from 1976 onwards. Thus we were obliged to use 1976 data. However, as the number of hospital beds changes very slowly over time this did not pose a serious problem.

Demographic data are based on 1971 census information and were provided to us in collected form by OHIP.

Aggregate data on OHIP billings by specialty group by option type are available from the OHIP *I* Reports, which provide quarterly billing figures. Data specific to this survey were generated through a mailed Physician's Background Information questionnaire (henceforth referred to by the notation PBI), and an administered Physician Interview Questionnaire (henceforth referred to by the notation PIQ).

INDEX OF VARIABLES

ABUSE: Percentage of respondent's patients who seek care without medical cause in respondent's opinion. (PIQ.9a)

ACTBED: Number of active hospital beds per 1000 population in the county where the respondent is practising. Data compiled by the Ministry of Health from Canadian census data 1971 and the Hospital Bed Inventory Form 1976.

AGE: Respondent's age. (PBI.7a)

ANESTY: Certified anaesthetist (PBIa) plus those general practitioners who do only anaesthesiology. (Reports 4–9)

AVINC: Average family income in respondent's county. Data compiled by Ministry of Health from census data 1971.

BIRTHENG: Dummy variable assuming the value 1 if respondent was born in England. (PBI.7h)

BIRTHOTH: Dummy variable assuming the value 1 if respondent was born elsewhere than England or Canada. (PBI.7h)

CAPITTAC: Dummy variable assuming the value 1 if respondent considers capitation to be an acceptable form of remuneration for medical practice. (PIQ.11a)

CCFP: Dummy variable assuming the value 1 if respondent is a general practitioner who is also a certificant of the College of Family Physicians. (PBI.8e)

CHANGHRS: Dummy variable assuming the value 1 if respondent reported that his hours of work were longer at time of interview than during period covered by profile. (PIQ covering page)

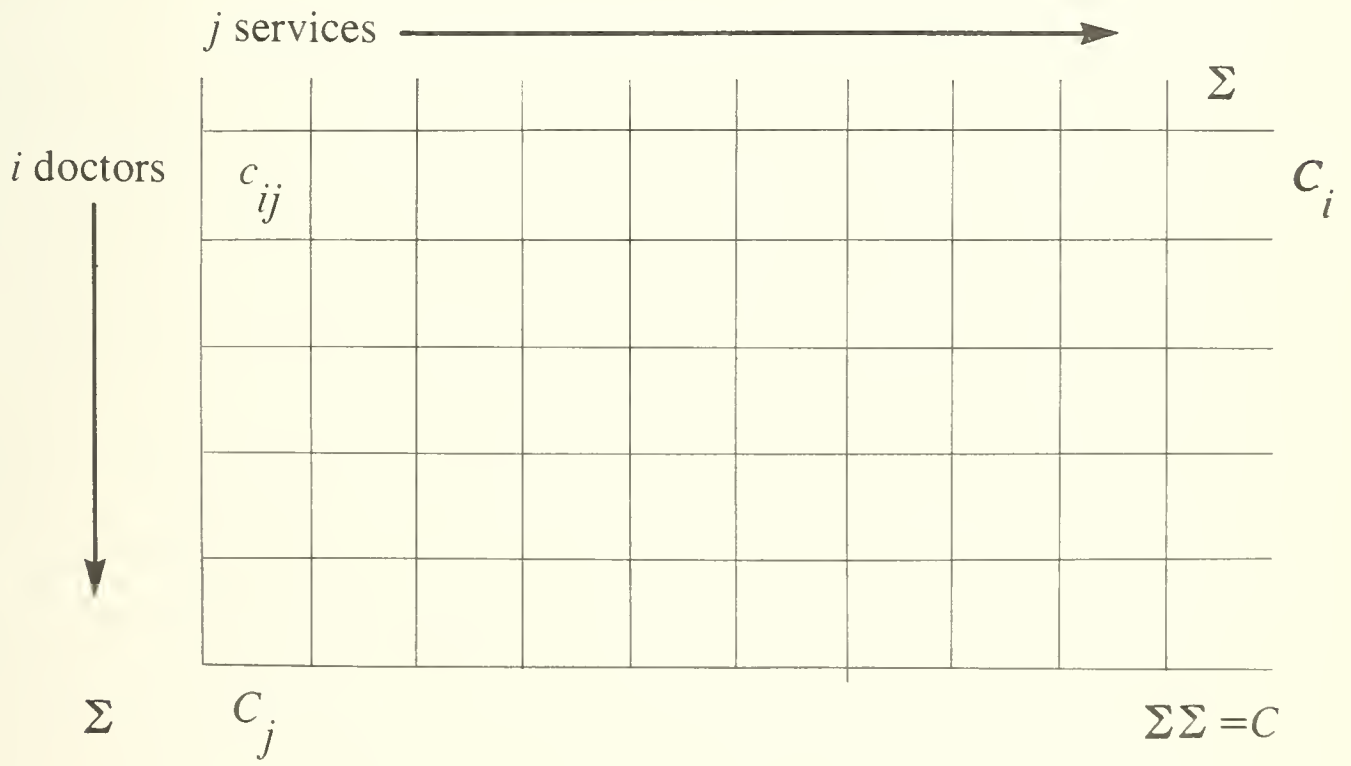
COLLBARG: Dummy variable assuming the value 1 if respondent considers negotiation between the medical profession and government to be an appropriate way of setting the medical fee schedule. (PIQ-11c)

COMDOC: (For general practitioners only) Number of specialists per thousand in respondent's county. Data for 1975 provided by OHIP.

COMMCLIN: Dummy variable assuming the value 1 if respondent considers 'community clinics managed by lay and medical boards' to be an acceptable way of organizing health care delivery. (PIQ.12a)

COMPLEX: A measure of the complexity of the services provided by the respondent relative to the services provided by all 420 physicians during the time period studied.[2] The distribution of services among the 420 doctors was examined, and services relatively concentrated among fewer doctors were considered to be more complex than services that were relatively dispersed among all doctors, i.e. concentration = complexity. This relative concentration of each service was calculated (H_j below), standardized for volume of services provided ($\bar{H}_j$), and used to weight the proportion of an individual physician's practice which a particular service represented. Thus the interpretation to be given to a relatively high volume for COMPLEX is that this physician's practice is characterized by services whose provision is concentrated among relatively few of the 420 doctors studied. Data taken from Reports 4–9.

Illustration and formulas:



2 The relevance of such a measure in medical economics was first demonstrated by Evans and Walker (1972).

$q_{ij} = c_{ij}/C_j$ is the proportion of service type j going to the ith doctor;
$Q_j = c_j/C$ is the distribution of total services by service type;
$p_{ij} = c_{ij}/C_i$ is the proportion of service j in i's practice;

$$H_j = \Sigma_{i=1}^{N} q_{ij} \ln (N.q_{ij}),$$

where N is the number of doctors. Then

$$H_j = H_j/\Sigma_j (H_j Q_j);$$

so that

$$X_i = \Sigma_j H_j p_{ij} = \text{COMPLEX}.$$

CONS: A dummy variable which takes the value 1 if this physician considers himself to be more conservative than the OMA. (PIQ.13c)

COST: Dummy variable assuming the value 1 if respondent believes the cost of treatment should be taken into account in recommending treatment. (PIQ.12f)

CPCTOUT 1: The percentage of all physicians in the same county as respondent who were opted out of OHIP as of April 1974. Respondent is excluded from numerator and denominator. Data on option status by county was provided by OHIP.

CPCTOUT: The percentage of all physicians in the same county and the same specialty as respondent who were opted out of OHIP as of April 1974. Respondent is excluded from numerator and denominator. Data on option status by specialty by county was provided by OHIP.

DEPENDTS: Number of dependants reported by the respondent. (PBI.7d)

DOLPRPAT: Dollars billed per patient by respondent for January 1976. Data from Report 17.

EMBILL: Average billing for other physicians of the same specialty in the same county[3] as respondent for the most recent month reported (January 1976). Data on specialty-specific, county-specific, average billings are contained in Report 17, and in each instance the respondent's own billings were excluded from the reported averages. Data on number of physicians by specialty by county, district, and province were obtained from OHIP to make the latter adjustment.

EMBILLR: The ratio of respondent's billing to the county average (see note 3) for all physicians of the same specialty for the last month reported (January 1976) in the Profile Report 17. If this was a month in which he worked less than usual (< 0.9 of his nine-month average), then his nine-month average billings were used instead.

3 Where there were fewer than five such physicians in the same county, the reference area became the district or, if necessary, the province.

EMPAT: Number of separate patients seen by the average physician of the same specialty in the same county (see note 3) as respondent for the most recent month reported (January 1976). Data on specialty-specific, county-specific, average patient loads are contained in Report 17, and in each instance the respondent's own patient load was excluded from the average. Data on number of physicians by specialty by county, district, and province were obtained from OHIP to make the latter adjustment.

EMPATR: The ratio of respondent's patient load to the county average (see note 3) for all physicians of the same specialty for the last month reported (January 1976). Report 17. If this was a month in which he worked less than usual (< 0.9 of his nine-month average) then his nine-month average patient load was used instead.

EMREFS: Average dollar value of referrals for consultations and repeat consultations made by other physicians of the same specialty in the same county (see note 3) as respondent, for the most recent month reported (January 1976). Data on specialty-specific, county-specific, average referrals are contained in Report 12, and in each instance the respondent's own referrals were excluded from the reported averages. Data on number of physicians by specialty by county, district, and province were obtained from OHIP to make the latter adjustment.

EMREFSR: The ratio of the dollar value of respondent's referrals for office consultations and repeat consultations to the county average (see note 3) for all physicians of the same specialty for the last month reported (January 1976). Report 12. If this was a month in which he worked less than usual (< 0.9 of his nine-month average), then the nine-month average referrals were used instead.

EXPENSES: Total practice expenses as reported by respondent. For group physicians, the respondent's share of group expenses. (PBI.6a; PIQ.2e)

FULLTIME: Dummy variable assuming the value 1 if respondent has a full-time appointment to the teaching staff of a medical school. (PBI.3c)

GOVPWRD: Dummy variable which assumes the value 1 if respondent believes that government has too much power in planning the delivery of health services. Computed from PIQ.13a and 13b.

GPY: Gross professional earnings of the respondent. Computed by adjusting his OHIP billings by his relative average price and his reported percentage loss through default and collection fees (PIQ.3h) and then inflating by 12/9 to put on a yearly basis.

$$\text{GPY} = \text{TOTDOL} \times \text{PRICE}/100 \times (100 - \text{PIQ.3h})/100 \times 12/9.$$

GRADSCL1: Dummy variable assuming the value 1 if respondent graduated from an Ontario medical school (Report 3). Although there is some infor-

mation in Report 3 on graduation from specific Ontario schools, it is neither reliable enough nor available for a large enough proportion of our sample to justify its inclusion.

GROUP: Percentage of a physician's practice which is in group form. (PBI.2a)

GROUPDUM: Dummy variable assuming the value 1 if respondent belonged to a group which shared both expenses and income. (PBI.2e, 2f)

HARASS: Dummy variable assuming the value 1 if respondent scores $\geqq 14$ on a Likert scale indicating the frequency with which the respondent reports seeing 'problem patients.' The scale was constructed from PIQ.9c by assigning values to responses as follows: Often = 4, Sometimes = 3, Seldom = 2, Never = 1. Values on all six items in the questionnaire were then summed. Each of the items of the scale is correlated at $p = 0.001$ with the scale cleaned for autocorrelation.

HOURS: Hours worked per week on the provision of patient care i.e. exclusive of teaching, administration, and research. This was calculated by summing the reported hours in PIQ.1e-1h and then adjusting for weeks worked per year. (PIQ.1a) (i.e. hours × weeks worked/52)

IDEOLOGY: Dummy variable assuming the value 1 if respondent reports ideological rather than financial reasons for opting out of OHIP. (PIQ.3a)

INFHOSPD: Dummy variable assuming the value 1 if respondent reports that hospital committees or departments have a great or moderate amount of influence on his practice. (PIQ.10a)

INFMRC: Dummy variable assuming the value 1 if respondent reports that the Medical Review Committee has a great or moderate amount of influence on his practice. (PIQ.10a)

LABOUR: Salaries paid to practice employees. (PBI.6a) If salaries reported were those of a group they were deflated to reflect respondent's share. (PBI.2e)

LESSMRC: Dummy variable assuming the value 1 if respondent believes the MRC has too much power. (PIQ.10b)

LIBERAL: Dummy variable which takes the value 1 if respondent considers himself to be more liberal than the OMA. (PIQ.13c)

MAC: Dummy variable which takes the value 1 if respondent has served on a hospital Medical Advisory Committee. (PBI.8a)

MEDICINE: Certified in one of the following specialties – dermatology, internal medicine, neurology, physical medicine, gastroenterology, respiratory disease, rheumatology, cardiology, haemotology, clinical immunology. (PBI.1a)

MEDPWRD: Dummy variable which assumes the value 1 if respondent believes that the medical profession should have more power than it has

at present in planning the delivery of health services. Computed from PIQ.13a and 13b.

MEDVSGOV: Dummy variable which assumes the value 1 if respondent believes that the medical profession should have more power than government in planning the delivery of health services. Computed from PIQ.13a.

MIXGROUP: Dummy variable assuming the value 1 if respondent belongs to a multispecialty group. (PBI.2a, 2b)

NUMCOMMS: The number of a set of hospital medical staff committees (Credentials, Tissue and Audit, Admissions and Discharge, Medical Records) on which respondent has served. (PBI.8a)

NUMHOSP: Number of hospitals at which respondent holds privileges. (PBI.3a)

OBSGYN: Certified in obstetrics and gynaecology. (PBI.1a)

OPEN: Dummy variable assuming the value 1 if respondent accepts new patients. (PIQ.4a)

OPTD: Dummy variable assuming the value 1 if respondent reports financial reasons for opting out. (PIQ.5a)

OPTION: Dummy variable assuming the value 1 if respondent has opted out of OHIP. (PBI.5a)

OTHERDOC: Number of other doctors per 1000 population in the same county regardless of their specialty. Data on doctors by specialty by county for 1975 provided by OHIP.

OTHRHOUR: Hours worked per week in non-clinical professional activities, e.g. teaching, research, paperwork, committee work, administration, etc. (PIQ.1i, j). Adjusted for weeks worked per year (see HOURS).

OTHRHR 1: As OTHRHOUR, but not adjusted for weeks worked per year.

OVERHEAD: Defined as total annual office expenses (PBI.6a) less salaries. Adjusted by the appropriate share (PIQ.2e) if reported expenses are those of a group.

PARASUP: Dummy variable assuming the value 1 if respondent approves of the practice of 'team medicine' involving physicians and other health workers as long as the leadership of the team is exercised by a physician. (PIQ.12b)

PARATEAM: Dummy variable assuming the value 1 if respondent approves of the practice of 'team medicine' involving physicians and other health workers with the leadership of the team rotating among the team members as the patients' problems require. (PIQ.12b)

PARTTIME: Dummy variable assuming the value 1 if respondent has a part-time appointment to the teaching staff of a medical school. (PBI.3c)

PATHOURS: Reported hours per week in patient care. (PIQ.1e-1h)

PATWISH: Dummy variable assuming the value 1 if respondent believes that the patient's wishes, as well as his medical condition, should be taken into account in a physician's judgment regarding the course of treatment. (PIQ.12f)

PCTSAL: Percentage of professional remuneration derived from salary. (PBI.4)

PEDS: Certified in paediatrics. (PBI.1a)

PPCTOUT: Percentage of all Ontario physicians in respondent's specialty who were opted out of OHIP as of April 1974. Data provided by OHIP.

PRICDISC: Dummy variable assuming the value 1 if respondent reports varying his prices according to the patient's ability to pay. (PIQ.3e)

PRICE: A price index representing the average price for services provided by an opted-out physician. The base value of 100 is assigned to the opted-in physicians who collected 90 per cent of the prevailing OMA rate from OHIP. Data required for the calculation were taken from responses to Question 3, subsections c, d, f, g, of the Physician Interview Questionnaire. In subsection f the physicians informed us of their average markup over the OMA rate. To interpret this properly we adjusted it (1) for the relative proportion of his services actually billed at the OMA rate and not at his higher rate and (2) for his decision whether or not to accept the 90 per cent provided indirectly by OHIP as full payment, regardless of whether or not he had decided to bill at the OMA rate or higher, or to request that the patient make up the difference. Consequently, there are four components to a physician's billing and payment practices which must be used as weights when computing an average price:

	Billing OMA rate	Billing above OMA rate
Payment 90% of OMA rate	(i)	(iii)
Payment amount billed	(ii)	(iv)

From PIQ.3c, d, f, g we know:
PCTOMA = percentage of services billed at OMA rate.
PCT90A = percentage of PCTOMA for which payment at 90 per cent of OMA rate is accepted.

PCTOVER = percentage of services billed above OMA rate.
RATEOVER = average percentage by which bills above OMA rate exceed OMA rate.
PCT90B = percentage of PCTOVER for which payment at 90 per cent of OMA rate is accepted.

PRICE is equal, then, to the sum of:

i) the percentage of his services billed at 100 per cent of the OMA rate but paid at 90 per cent (times the relative price of 100/100 i.e. billings and payments which are equivalent to opted-in physicians)
= [PCT90A × PCTOMA] × 100/100;

ii) the percentage of his services billed and paid at the listed OMA rate (times the relative price of 100/90)
= [PCTOMA − (PCT90A times PCTOMA)] times 100/90;

iii) the percentage of his services billed above the OMA rate but paid at 90 per cent (times the relative price of 100/100)
= [PCTOVER × PCT90B] × 100/100;

iv) the percentage of his services billed and paid above the OMA rate (times the relative price of [100 + RATEOVER]/90)
= [PCTOVER − (PCTOVER × PCT90B)] × [100 + RATEOVER]/90.

For example, an opted-out physician who (1) bills 50 per cent of his practice at 25 per cent above the OMA rate (bills the remainder at the OMA rate) and (2) accepts the 90 per cent from OHIP in all cases where he has only billed at the OMA rate but requests full payment for the remainder, would have given us the following answers:

PCTOMA (PIQ.3c) – 50,
PCT90A (PIQ.3d) – 100,
PCTOVER (PIQ.3f) – 50,
RATEOVER – 25,
PCT90B (PIQ.3g) – 0,

and would have the following PRICE:

(i)	(100 × 50/100) × 100/100	= 50
(ii)	(50 − [100 × 50]/100) × (100/90)	= 0
(iii)	(50 × 0/100) × 100/100	= 0
(iv)	(50 − [50 × (0/100)] × (100 + 25)/90	
	= 50 × 125/90	= 69.4
		PRICE = 119.4

PSYCH: Certified in psychiatry. (PBI.1a)

QUEUE: Average number of days between the time a patient requests services and the time of an encounter with the respondent. Compiled by

adjusting the average waiting time for appointment (PIQ.6e) by the percentage of patients seen the same day (PIQ.6f).

QUEUE = PIQ.6e × (1 − PIQ.6f/100)

REFS: The dollar value of referrals for consultations and repeat consultations requested by the respondent for his patients during the nine-month period May 1975–June 1976. Report 12.

RELPOV: The average OHIP billings of physicians of a respondent's specialty relative to the average of all physicians. Calculated on the basis of opted-in physicians only. Data source is the OHIP I Report, April 1974.

REPHOURS: Hours worked per week as reported in PIQ.1b.

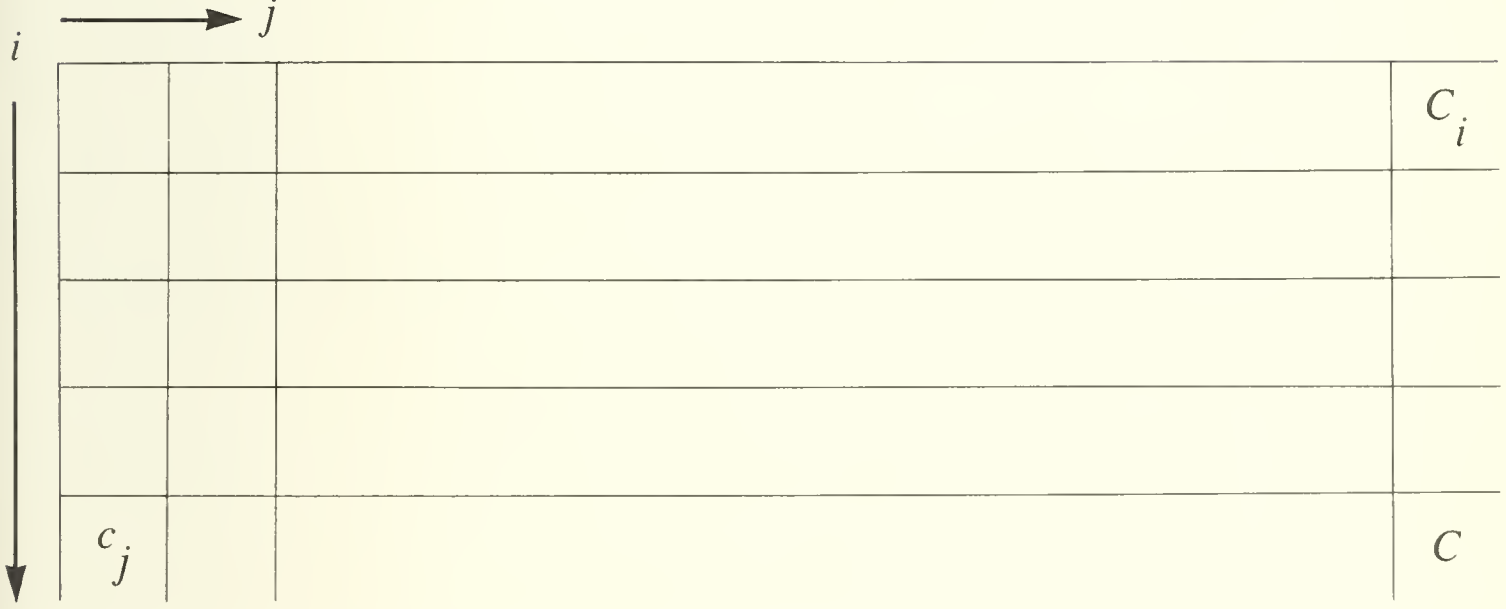
SECURE: Dummy variable assuming the value 1 if the respondent feels sufficiently secure financially to reduce the volume of his practice if it were desirable. (PIQ.2d)

SELFREF: A measure of the degree to which the respondent's patients will seek out the services of another physician without a referral being requested. Report 14 provided the total personal services provided by other physicians to any patient seen by an individual physician in the same month. Note that the patient who sees two physicians will be included in the 'services by other physicians' statistic of each. Report 12 provides the total office consultations and repeat consultations requested by the particular physician that make up a part, but not all, of the total personal services offered by other physicians. The difference between the total personal services provided by other physicians (Report 14) and the consultations and repeat consultations requested by a physician (Report 12) is thus a sum of patient self-referrals plus other personal services provided by consultants as a followup to the initial consultation which was requested. We assume that the latter is randomly distributed among referring physicians and consider the variation in the difference between Reports 14 and 12 to reflect patient self-referral. For obvious reasons this is a reasonable measure only when applied to general or family practitioners and not to specialists.

SPECASEX: A measure similar in concept to that of COMPLEX except that it reflects the relative concentration of patient load in any particular age and sex grouping. A doctor with a high value is relatively specialized in the age and sex of patient he sees, regardless of age-sex grouping and whether other doctors are more or less concentrated in this particular group. With respect to the latter point, no weighting is done as for COMPLEX. In summary, then, SPECASEX measures the distribution of a physician's practice among age-sex groupings relative to the distribution of the average physician's practice among these groups. Data source is Report 17.

Groups	
Males	Females
< 1 year	< 1 year
1–4 yrs	1–4 yrs
5–9	5–9
10–14	10–14
15–19	15–19
20–24	20–24
25–34	25–34
35–49	35–44
50–64	45–54
> 64	55–64
	> 64

For i doctors and j age-sex groups



p_{ij} = proportion of doctor i's patients falling into group j;
Q_j = proportion of group j in the average doctor's practice where
N = 420 doctors
$= \Sigma_{i=1}^{N} p_{ij}/N$;
$p_i = C_i C$ = relative size of practice of physician i, then
$G_i = \Sigma_j p_{ij} \ln (p_{ij} Q_j)$;
and SPECASEX = $G_i / \Sigma G_i p_i$, i.e. standardized for size of practice.

SPEMP: Dummy variable assuming the value 1 if the respondent's spouse is employed either full-time or part-time. (PBI.7e)

SUBDOC: (For general practitioners only) Number of general practitioners per thousand population in respondent's county. Data for 1975 provided by OHIP.

SUMHOURS: Sum of reported hours worked per week in all categories, exclusive of on-call time. (PIQ.1e-j)

SURGERY: Dummy variable assuming the value 1 if the respondent is certified in one of general surgery, neurosurgery, orthopaedic surgery, plastic surgery, cardiovascular and thoracic surgery, ophthalmology, otolaryngology, urology.

TESTS: Estimated twelve-month dollar value of laboratory investigations and radiological tests ordered by respondent. Report 12 provides the appropriate information but only for services done outside hospitals and provincial labs. All lab investigations done in hospital are billed in bulk form, as are in-patient roentograms, without mention of which physicians might have ordered the procedures. Outpatient radiological work is billed on a fee-for-service basis. Consequently the data contain accurate information on lab and radiological work done outside the hospital, plus radiological work done on an out-patient basis within the hospital. Thus we were required to estimate the total lab services ordered by inflating the lab figures in Report 12 by the proportion of services performed in hospital and provincial labs as reported by the respondent in PIQ.5a. Total lab investigations = reported data, May 1975 to January 1976 × 100/ (% group + % commercial). The radiological data do not allow such an extrapolation because the distinction between outpatient hospital services and other radiological services is not made in Report 12. Consequently we were obliged to use the radiological data as reported, although realizing that it does not include X-rays ordered for hospital in-patients. The total estimate for laboratory and radiological work ordered was then multiplied by 12/9 to put it on a twelve-month basis.

TOOLATE: Percentage of respondent's patients who wait too long in seeking medical care in respondent's opinion. (PIQ.9b)

TOTDOL: Total OHIP billings for the respondent for nine-month period May 1975 to January 1976. Data source is Report 17.

TOTHOUR1: Total hours worked per week, exclusive of on-call hours. To avoid overestimation of total hours the smaller of (1) the reported total (PIQ.1b) and (2) the sum of the components PIQ.1e-1j was considered to be the more valid estimate of hours worked.

TOTHOUR2: Same as TOTHOUR1, but adjusted for weeks worked per year (see HOURS).

TOTPAT: Total discrete patient load for the respondent for the five-month period September 1975–January 1976. The patient counts produced by OHIP for the nine-month period represent discrete patients within months only and not across months, i.e. a patient seen twice in the same month is counted as only one patient, but if seen in succeeding months is counted as a new patient each time he is seen. Consequently these figures will systematically inflate patient counts for those doctors who recall their patients more often. To arrive at a more accurate figure for total patient load per physician we used the Frequency of Treatment Report 18. Here patients seen in any particular month are reported as new presenting patients or as patients who have previously presented 1, 2, 3, or 5–12 months ago. Consequently, a 5-month total discrete patient count can be built by adding all September patients (within the month and thus discrete).

+ all October patients less patients seen 1 month ago.
+ all November patients less (patients seen 1 month ago and 2 months ago),
+ all December patients less (patients seen 1, 2, and 3 months ago.)
+ all January patients less (patients seen 1, 2, 3, and 4 months ago).

URBAN: Dummy variable assuming a value of 1 if the respondent is practising in a community with population greater than 10 000. Reported by interviewers.

WEEKS: Number of weeks worked per year. (PIQ.1a)

YRSLCN: A dummy variable assuming the value 1 if the respondent has been practising in this locality for two years or less i.e. a measure of which practices are in the startup phase. (PBI.7f)

YRSLOCAL: Number of years of practice in present neighbourhood. (PBI.7f)

YRSPRAC: Total years in practice. (PBI.7g)

YRSPRCSQ: Total years in practice squared. (PBI.7g)

APPENDIX D

Means and standard deviations of variables by regime

Variable	INGPS	INSPECS	ALLOUT	ALL GPS	ALLSPECS
ACTBED	6.07	6.85	6.37	6.063	6.69
	(3.86)	(3.27)	(1.20)	(3.674)	(2.60)
ANESTY		0.0115	0.079		0.109
		(0.321)	(0.271)		(0.312)
AVINC	10225	10920	11189	10313	11054
	(1473)	(1084)	(944)	(1445)	(1027)
BIRTHENG			0.180		
			(0.386)		
BIRTHOTH			0.101		
			(0.303)		
CCFP	0.136		0.056	0.153	
	(0.344)		(0.232)	(0.361)	
CHANGHRS	0.159	0.087	0.079	0.153	0.080
	(0.367)	(0.283)	(0.271)	(0.362)	(0.272)
COMDOC	0.842				0.855
	(0.204)				(0.195)
COMPLEX	0.581	1.20	0.992	0.585	1.15
	(0.178)	(0.430)	(0.351)	(0.178)	(0.392)
CONS	0.114	0.125	0.202	0.127	0.154
	(0.319)	(0.332)	(0.404)	(0.334)	(0.362)
COST	0.616	0.596	0.640	0.6067	0.617
	(0.490)	(0.493)	(0.483)	(0.4901)	(0.488)
CPCTOUT	4.43	14.9	33.2	4.84	24.9
	(4.45)	(19.4)	(22.01)	(4.51)	(23.0)
DEPENDTS	2.67	3.01	3.011	2.71	3.02
	(1.65)	(1.74)	(1.85)	(1.72)	(1.73)
EMBILL	4251	5837	5052	4204	5610
	(527)	(1725)	(1480)	(526)	(1678)
EMPAT	349	210	208	349	195
	(43.0)	(132)	(124)	(42.9)	(124)

Variable	INGPS	INSPECS	ALLOUT	ALL GPS	ALLSPECS
EMREFS	428	124	380	433	218
	(134)	(87.7)	(1313)	(127)	(942)
FULLTIME		0.154	0.079		0.131
		(0.363)	(0.271)		(0.339)
GRADSCL			4.05		
			(3.57)		
GROUP	40.7	29.3	25.8	39.98	26.9
	(48.7)	(44.9)	(42.2)	(48.4)	(43.2)
HARASS	0.735	0.327	0.382	0.700	0.343
	(0.443)	(0.471)	(0.489)	(1.459)	(0.476)
HOURS	45.2	40.6	40.4	44.7	40.4
	(11.5)	(11.5)	(10.2)	(11.3)	(11.1)
IDEOLOGY			4.40		
			(8.24)		
LABOUR	9263	8617	9258	9491	8682
	(5988)	(5960)	(7610)	(6134)	(4340)
LESSMRC	0.152	0.144	0.202	0.173	0.154
	(0.360)	(0.353)	(0.404)	(0.3798)	(0.362)
LIBERAL	0.333	0.346	0.202	0.313	0.291
	(0.473)	(0.478)	(0.404)	(0.465)	(0.456)
MAC	0.508	0.462	0.438	0.507	0.446
	(0.502)	(0.501)	(0.499)	(0.502)	(0.499)
MEDICINE		0.144	0.067		0.120
		(0.353)	(0.252)		(0.326)
MEDSVGOV			0.910		
			(0.848)		
MIXGROUP	0.098	0.087	0.045	0.087	0.074
	(0.299)	(0.283)	(0.208)	(0.282)	(0.263)
NUMCOMMS	1.39	1.01	1.03	1.35	1.02
	(1.42)	(1.10)	(1.26)	(1.42)	(1.15)
NUMHOSP	1.65	2.49	2.00	1.68	2.30
	(1.07)	(1.48)	(1.45)	(1.10)	(1.49)
OBSGYN		0.096	0.124		0.120
		(0.296)	(0.331)		(0.326)
OPTION				0.120	0.406
				(0.326)	(0.492)
OTHERDOC	1.28	1.063	1.17	1.301	1.08
	(0.384)	(0.398)	(0.402)	(0.326)	(0.38)
OVERHEAD	12903	12341	15032	12981	13585
	(9559)	(7822)	(10763)	(9199)	(5329)
PARASUP	0.533	0.538	0.506	0.540	0.531
	(0.499)	(0.5011)	(0.503)	(0.500)	(0.500)
PARATEAM	0.311	0.183	0.270	0.307	0.217
	(0.465)	(0.388)	(0.446)	(0.463)	(0.413)
PARTTIME	0.068	0.260	0.393	0.093	0.325
	(0.253)	(0.441)	(0.491)	(0.292)	(0.470)

Variable	INGPS	INSPECS	ALLOUT	ALL GPS	ALLSPECS
PATWISH	0.636	0.692	0.820	0.673	0.731
	(0.483)	(0.464)	(0.386)	(0.471)	(0.445)
PEDS		0.087	0.034		0.0667
		(0.283)	(0.181)		(0.250)
PRICE			121	102	109
			(15.3)	(8.26)	(14.4)
PSYCH		0.058	0.270		0.171
		(0.234)	(0.446)		(0.378)
QUEUE	3.44	14.8	15.9	4.00	16.1
	(4.73)	(20.2)	(18.0)	(4.79)	(19.7)
REFS	4472	1420	2122	4485	1452
	(3342)	(2037)	(2846)	(3322)	(2175)
RELPOV			0.844		
			(0.182)		
SELFREF	14307	30843	17858	13945	26250
	(15283)	(26473)	(15182)	(15517)	(22965)
SPECASEX	0.553	1.56	1.85	0.595	1.77
	(0.793)	(1.59)	(1.43)	(0.800)	(1.56)
SPEMP	0.258	0.192	0.292	0.240	0.251
	(0.439)	(0.396)	(0.457)	(0.429)	(0.435)
SUBDOC		0.222			0.221
		(0.316)			(0.315)
SURGERY		0.500	0.225		0.411
		(0.502)	(0.420)		(0.493)
TESTS	24621	9946	11360	24502	9258
	(29665)	(18650)	(21425)	(28843)	(19223)
TOTDOL	45870	59307	46468	44082	55691
	(27168)	(29442)	(20465)	(26173)	(26501)
TOTPAT	1360	870	702	1304	782
	(735)	(637)	(615)	(727)	(642)
URBAN	0.614	0.933	0.966	0.647	0.954
	(0.489)	(0.252)	(0.181)	(0.480)	(0.209)
YRSLCN 2	0.030	0.048	0.022	0.033	0.034
	(0.172)	(0.215)	(0.149)	(0.180)	(0.182)
YRSLOCAL	11.8	11.4	11.8	12.4	11.0
	(8.96)	(9.16)	(8.20)	(9.24)	(8.38)
YRSPRAC	16.3	15.1	15.7	16.6	16.0
	(11.5)	(10.9)	(9.37)	(11.2)	(10.2)
YRSPRACSQ	397	345	332	403	328
	(487)	(460)	(385)	(478)	(426)

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Ontario Economic Council Research Studies

19 Opting Out of Medicare: private medical markets in Ontario

A.D. WOLFSON and CAROLYN J. TUOHY

Canadian medicare is in trouble. Doctors in a number of provinces have begun to bill their patients at rates considerably above the level of the provincial program, leaving the province to reimburse the individual at the medicare level. In mid-1979 in Ontario nearly one out of every five physicians chose to 'opt out' of the provincial program of medical care; their choice poses a grave threat to the spirit of a program meant to ensure universal access to medical services.

In their study of the kinds of doctors who choose to opt out of OHIP, the authors examine a wide range of statistics related to the growth of private medical markets for services insured by the program. They raise a number of questions about relationships between individual doctors, their patients, their medical colleagues, medical organizations, and government. Although medical criteria are important in determining the services a physician will supply, practical decisions concerning hours of work, prices charged, and scheduling of appointments must be made with reference to social, economic, and political factors.

The authors emphasize the political and economic influences in their analysis of physicians' practices. They use material gathered from physician profiles maintained in OHIP files, together with a large amount of original and comprehensive information resulting from a survey sponsored by the Physicians' Services Incorporated Foundation. The data reveal that a high proportion of specialists, urban practitioners, and ideological conservatives have chosen to opt out of OHIP, as have many academic physicians.

Universal medicare is threatened by a financial dispute which has serious social implications: should the private sector bear a significant proportion of the burden of medical costs or should it be, as the authors contend, the responsibility of the public sector to bear and control the costs of medical care?

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